

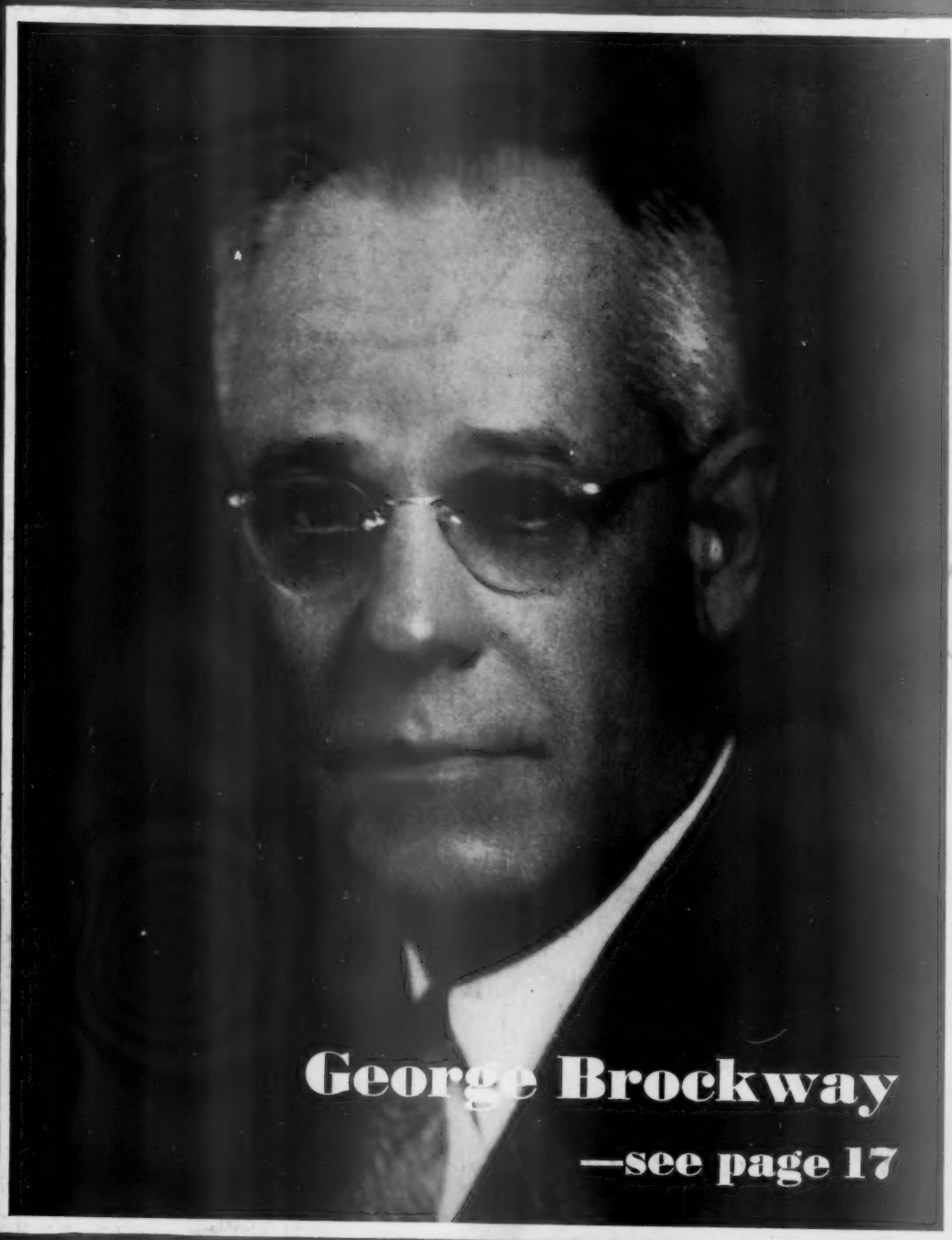
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George Brockway

—see page 17

Vol. V No. 6

JUNE 1937



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Contents for June

Next Month:
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BUYS

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June 1937

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PAGE 2

PURCHASING

LONG DISTANCE dovetails supply and demand



AN EASTERN FIRM dealing in used machinery finds it profitable to buy and sell largely by Long Distance Telephone Service.

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Yours on Request

Purchasing agents will find it well worth their while to read the publications reviewed on this and the following pages. From among the many submitted to us, they have been selected by the editors as having greatest interest and utility value to purchasing agents.

To obtain copies, simply fill in and mail coupon at the bottom of this page.

101. Sectional views, demonstrating how Jenkins Solder-End Valves are constructed to withstand the intense heat encountered in soldering, feature two bulletins prepared by Jenkins Bros. to illustrate its complete line of this type of valve. One bulletin shows valves with plain ends, the other valves for use with Mueller Brass Co. Streamline Copper Pipe.

102. As its title indicates, "Your Fence: How to Choose It—How to Use It" contains detailed information to guide the prospective buyer of fence in selecting the right type for the desired purpose. This 32-page, amply illustrated book of the Cyclone Fence Co. describes how its fence is made and why, different kinds of fencing, specifications, industrial applications, etc.

103. Written in narrative style and featured by fine photography, "Masters of Metal" is a highly interesting 24-page book depicting the complete facilities of the Scovill Mfg. Co. and its various divisions. The extensive scope and variety of this organization's products is news to even experienced buyers. This is one outfit which can lay claim to making anything from a "pin to an anchor".

104. Power, speed, ruggedness, long life, experience and performance are the characteristics to be sought by the buyer of batteries. Each of these characteristics is described in an 8-page, 8 1/2" X 11" booklet of the Electric Storage Battery Co. entitled "In Selecting Any Motive Power Battery, Be Sure—". A clear analysis of the standards to be taken into consideration by battery users.

105. The "Kable Kord Data Book" conveys a wealth of information to belt users. Published by L. H. Gilmer Co., it shows detailed charts of horse power, power ratings, arc of contacts, weights, engineering data and formulae, break strengths . . . of both endless and non-endless belts. 8 1/2" X 11" in size, it fits conveniently into the standard cabinet file. It is also punched for loose-leaf filing.

106. The distinctive properties of four industrial lubricants, with particular attention to colloidal graphite, are defined in a folder of the Grafo Lubricants Corp. These four products are applicable to virtually every lubrication requirement in industry. Many plants compound them with oil or kerosene to their own specifications. Results claimed for these lubricants include quieter operation, cooler bearings, higher speeds and heavier loads with less wear.

107. In concise catalog style, a new 24-page booklet sets forth specifications and description of the Homestead Valve Company's line of quarter turn and Hovalco Blow-Off Valves. An interesting table of losses due to leaks of air, steam and water appears on the back page.

108. An inexpensive, easily installed call system is the subject of a bulletin issued by Wyzenbeek & Staff, Inc. This system does not require the services of a sound engineer. Two loudspeakers are furnished, but additional loudspeakers may be purchased separately at nominal cost.

109. Catalog No. 8 of the Eureka Blank Book Co. devotes 66 pages to a description and price list of an extensive line of business forms and books. The more than ninety different items represented, covering requirements for every business firm, include ruled forms of all kinds, bound books, pads, loose leaf fillers, order books, statements, bills, checks, etc.

110. "Know Your Ropes" is the title of an elaborate 82-page manual of wire rope selection, application and usage telling how to make wire rope last longer. It is replete with practical suggestions far too numerous to list here. Among them however are hints for handling, laying, loading, cutting and lubricating wire rope. In presenting this invaluable material, the Wickwire Spencer Steel Co. is rendering a genuine service to wire rope users, none of whom should be without this constructive manual.

111. Bulletin No. 103 of the Edge Moor Iron Works announces special fabricated processing equipment, which is well illustrated and described in 8 pages. For use in the manufacturing or processing of chemicals, dyestuffs, soap, food, paint, varnish, lacquers, oil, drugs, paper, rubber, rayon, plastics, metal products, sugar, resin, etc.

112. A complete guide to the proper choice of casters to meet modern materials handling and production problems is represented by the new colorful catalog No. 120 of truck casters, issued by the Bassick Co. The clarity of the specifications and descriptions, as well as the large variety of items illustrated, will find favor with users of casters.

113. To keep industrial executives and engineers informed of developments and practical methods in the line of valves, fittings, pipe and tools, the Walworth Co. is now publishing a bi-monthly twelve-page magazine entitled "Walworth Today". Copies will be sent regularly to interested parties.

114. "Let's Discuss Uniforms" is the caption on the cover of the Angelica Jacket Co.'s new catalog. 48 colorful pages illustrating a wide variety of uniform styles, including complete uniforms, shirts, coats, pants, caps, aprons, smocks, dresses . . . for use in manufacturing plants, transportation companies, laboratories, restaurants, hotels, retail stores for every conceivable purpose.

115. Over 900 pages of technical, engineering and chemical data pertaining to the petroleum industry constitute the ninth edition of the Waverly Handbook, published by the Waverly Oil Works Co. and written and edited by outstanding engineers and chemists. Every phase of petroleum, from crude to finished products, is covered. The price per copy is \$1.50.

116. A pamphlet on rubber covered rolls, issued by the Quaker City Rubber Co., stresses the fact that the covering of rubber rolls is usually an individual problem and should be treated as such.

117. An interesting and informative 8-page booklet carrying a reprint of a radio address by Lawrence S. Mayers on "How to Choose a Diamond" has been published by L. & C. Mayers Co., Inc. In addition to some illuminating historical facts about diamonds, the booklet describes the essentials which govern the value of a diamond.

118. Containing 26 illustrations of the latest accepted standard method of drawing various types of bolts, nuts and rivets, the "Handbook of Common Machine Fasteners" will be welcomed in every drafting department. Russell, Burdall & Ward Bolt and Nut Co. designed this 20-page book as a part of the draftsman's equipment to fit into the average drawing instrument case.

119. An extensive line of trucks and wheels is illustrated and described in the American Pulley Co.'s Catalog No. T36. Among the trucks shown are general utility, warehouse, bag, box, barrel, railroad, stevedore, grain, cotton, clamp, cannery, paper, as well as many special purpose models, barrel cradles and skids, carboy tilters and trucks, "dollies", etc.

120. A clever tie-up with the recent coronation is effected by the Howard Paper Co. in a pamphlet stressing a "procession" of fourteen colors of Howard Bond—colors "fit for a king" . . . and for modern business needs.

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The Pittsburgh Convention

CHIEF pre-convention worry of the Pittsburgh committee in charge of the annual meeting of N.A.P.A., was the thought that the program, built around the city's notable manufacturing industries and industrial research facilities, might prove to be too "heavy" for popular consumption.

The first answer to this was an advance registration of 779, unprecedented in convention annals. The figure subsequently grew to record proportions—1,396. In direct competition with the P.G.A. tournament and the league-leading Pirates, the convention sessions were uniformly well attended. Evening commodity sessions, conflicting with a sparkling entertainment schedule, attracted capacity attendance and were among the highlights of the convention program. Interest in the well-selected plant inspection trips was unexpectedly keen.

Speakers from outside the association ranks were impressed with the character of their audience and the searching intelligence of the discussions which followed each address. Only one, a governmental representative, made the error of "talking down" to the meeting, and did irreparable harm to a cause that was otherwise ably presented and that can ill afford to flout the cooperation of industrial executives.

The new executive committee provides an impressive cross section of present day purchasing personnel. Practical executives all, these eleven men have an average of 24 years industrial and business experience, and an average of 16½ years in purchasing. One is secretary-treasurer of his company, two have a voice in production policies and direction, one is president of an outside business organization. Without exception they are the real heads of their respective departments and report directly to the chief executives. Seven are college trained, two are graduate engineers, and two have legal training and experience. Collectively, the group is truly representative of the profession and the association which they now direct.

No future convention committee, or local program chairman, need entertain any doubt as to the ability of purchasing men to take a serious program, and to like it. No technical man or management executive can have any sound basis for the old disparaging comment, "The purchasing agent doesn't understand our language." If there were any question on these points, it was effectively answered by the experience of the Pittsburgh convention. The Pittsburgh committee is to be congratulated, not only for staging a program of outstanding merit, interest and practical value, but for their accurate appraisal of the situation and their foresight in giving the delegates what they need and want as purchasing has come of age.

Purchasing is eminently a practical vocation. More and more it demands a practical program, embracing the technology of materials and their application, the economics of production, price and distribution, the intricacies of governmental legislation and controls, the broad viewpoint of a management function—all fused into the unique and important process of materials procurement.

Purchasing association work is becoming primarily an educational process. The Pittsburgh convention program was a concentrated course of education for the members. Incidentally, it provided a demonstration and a lesson for scores of visiting executives from other branches of industry, as to the true nature of the purchase function. In that direction lies the next great project—that business may appreciate the purchasing job—and profit by that appreciation.

STUART F. HEINRITZ, EDITOR

A Government Economist Discusses

Industry's Problems

LEON HENDERSON

**Economist
Works Progress Administration
Washington**

WHERE ARE WE in the business cycle? The record of twenty business cycles seems to indicate that the average recession lasts 22 months and the average recovery lasts 25 months. The length of the recovery period seems to average about 14% more than the recession period; and the length of the recovery period is usually determined by the time consumed in the down-turn.

The recent down-turn lasted 45 long months, and we are now in the 51st month of the current recovery. This is the longest recovery segment on record. The two segments approaching its length were significantly the Civil War and the World War segments.

The law of averages, if consulted independently, would say that this recovery would last only 51 months. If statisticians put any such faith in mechanistic forecasting, I would expect that about June 13th the Schenley heights would be crowded with mathematicians and econometrists, waiting as did the Millerites of old, for hard times to descend.

But every business man knows that there is a dynamic quality to recovery now, that the back-log of orders is of higher rank than a wagon load of data, and that as long as people have money, goods will move from the shelves. The first law of motion, as the sales manager and even the purchasing agent understand it, is the move of the hand toward the pocketbook.

In the period from 1899 to 1914, output per worker increased 30%, but the gains were pretty well diffused, so that farmers, wage earners and salaried workers got a large share. There was balance in the structure of production.

From 1914 to 1929, it was a different story. Man-hour productivity gained by leaps and bounds, but the gains were unevenly distributed. The machine process itself made it more difficult for prices to adjust easily, because of heavy fixed charges. There was a steady gain in concentrated control over business that added to rigidity, and helped draw off purchasing power that found its way into speculation and excess plant capacity. The price level remained fairly stable

during the twenties, which was the period of greatest growth, when there should have been a gradual lowering of prices to pass along technological gains.

The present recovery, to my mind, has been very substantial because of the repair which has been made to purchasing power in the hands of the lowest income groups, which would include those who did have employment, farmers and those on relief.

Since 1929, there has been a further gain in man-hour productivity of 20%—not just in manufacturing, but throughout the entire enterprise.

Here is the central reason why the price level cannot climb, though there are many other reasons also.

The period of greatest gains in production occurred during 1935 and 1936. During most of this period there was no change in the price level. I take the position that under the influence of NRA and other forces, a working balance was reestablished in the structure of production. Profits, reemployment and purchasing power gains all were substantial—and all were due almost completely to vigorous increases in goods and services turned out by the economic machine. There was hope that a lower price level, reflecting all the gains in efficiency, would maintain.

The price increase resurgence beginning last fall threatened this balance, and if it had not halted, I would have exercised my prerogative to forecast a collapse. I reserve that right if the Fall witnesses a resumption which induces over-buying, over-expansion and speculation,—but most of all, if it destroys the ability of consumers to buy. We can expect the retail prices to reflect the substantial increases in wholesale prices already recorded, and expect consumer retail prices to be 5 to 7½% higher before the end of the year. This burden will present a perplexity for consumer purchasing power to carry. At least 18 million people now derive most of their purchasing ability from Government. Their purchases will diminish. Many industries have their complements of labor, and we must look to service and luxury industries as the sources of new reemployment. These industries do not expand unless there are surpluses in the hands of the masses above the ordinary day-to-day purchases.

Already the instalment debt is menacing. In 1929 it was 6 billion—in 1936 it was 9 billion.

Concentration continues its steady increase, and mirrors its omnipresence with inordinate price rises.

Continued on page 68

An Industrial Executive Looks at **.....and Program**

WE ARE WELL ALONG the way to recovery, and have reached at least the midpoint in our progress. This recovery has been an unusual one in that it arose primarily from the improvement of business in the consumer goods industries, rather than in the capital goods industries. It differs from other periods of recovery in a second respect—in that it was started on its way by the expenditure of governmental credit.

We are not saying that this was the best way, or that recovery could not have been started sooner and progressed more rapidly and safely by other means. For our present practical purpose such a discussion is purely academic. We are in the midst of this particular kind of recovery and not some other imagined or more ideal kind.

Purchasing power (based on funds borrowed by the Federal Government and thrown into the general pool) is now 35% greater than it was in the peak of 1929; but that pool is a comparatively stagnant pool. Its velocity of circulation for business purposes is only about 55% of its 1929 activity and 75% of the rate of turnover which was normal for the long period of good business in the middle 20's.

New conditions face us in the field of labor. Those of our workers who wish for collective bargaining have no restraint put in their way. These restraints have not merely been removed, but organization for the purpose has been actively fostered by governmental action. In spite of considerable improvement in business and this superior tactical position of the worker, there is still remaining a volume of unemployment, whose size is unknown and whose character is largely guessed at but of whose seriousness no one is in doubt.

This is a mixed picture of good and evil. The present existing volume of business and of profits, of employment and wages, are the pleasant side of the picture. The unpleasant side deals largely with such intangibles as monetary and fiscal maladjustments and the present relationship of the human factors in industry.

Our relationships with labor must be based on good will and common sense, and sustained by faith. Faith is especially necessary in this rapid transitional period in which new factors are appearing every day and in which the rapidity of movement is so great that it has not been possible for the responsible elements on either side of the question to organize their forces or develop rational means of cooperation. Our faith is

RALPH E. FLANDERS

**President
Jones & Lamson Machine Co.
Springfield, Vermont**

that the present chaotic situation will soon be seen to be unsatisfactory to all parties concerned, and that a demand will arise from both employers and employees for leadership of the statesman-like sort which is able to recommend policies from the long-view and which will give enduring and solid gains to those dependent on them, instead of spectacular, short-lived and valueless victories.

The group of employers as a whole is directly concerned with the prosperity of the group of employees as a whole. Our greatest and most effective market lies here in America in the total potential consuming power of the great mass of its workers. It is both to our interest and in line with our desires to employ all possible means of building up and serving this market.

Fundamentally, wage-raising and shortening of hours as a progressive achievement are made possible by economy in production, by better equipment and by superior business management. There is also involved (and this is the point which the worker keeps in the forefront of his mind) the question as to how much of the returns of industry are going into profits and major salaries which could or should be diverted into higher wages. The tendency has been to look here for the margin to be applied to wage raising, rather than toward the improvements in method and machinery from which the workers' improvement in conditions has been derived in the past.

There is obviously an optimum division of the returns from industry between those who spend and consume and those who save and invest. While this optimum division may be less than that which has obtained during periods such as 1928 and 1929, we cannot in the interest of the worker himself allow the process of redistribution to proceed too far. The provision of funds for investment must be great enough to finance the following activities:

(1) It must finance and equip society for a growing population. While the rate of population growth is decreasing, the population is still growing and will continue to grow for some decades yet to come.

(2) It must finance and equip a rising standard of living. A rising standard of living is not primarily a matter of rising money incomes. It is fundamentally a matter of more goods and services made and distributed to more people.

(3) It must equip and finance shorter hours, if shorter hours are to be an element in our social objective. If there is no increased expenditure for new "labor-saving" equipment or no more efficient application of labor to the available equipment, then the output per worker and the consequent consumption and enjoyment per worker will be diminished by shorter hours and the movement will end in failure.

(4) It must finance the day shift, unless night work is considered to be an essential element of the more abundant life. When we put more people to work than ever before and demand for them more goods and services for them to enjoy, these goods and services can only be obtained under the prevailing shorter hours by running our inadequate supply of machinery, equipment, and facilities in two or three shifts.

(5) There must be enough savings and investment to make good our business losses. It is usually said that we are living under a profit economy. It would be better to call it a profit-and-loss economy. It may be safe to put money into the bank, with a properly operated banking system and with deposit insurance, but it is not safe to put money into business.

This is an impressive list of requirements for saving and investment, but each item is evidently a necessary one if the workers' ultimate interests are to be served. We must find some way of discussing these matters with them both with reference to the requirements an individual business and also for the requirements of the nation as a whole.

Going back to the question of improvement in machinery processes and products, much has been written as to whether these improvements should preferably be passed on to the public in the form of lowered prices or raised wages. Of course, the improvement must show in one form or the other, or in some combination of the two, if the improvement is to make its contribution to a raised standard of living. We are now quite definitely in a period where improvement will be asked for in the form of wages.

Analysis of a purely rational sort leads toward a preference for lowering the price of the product. If there is an elastic demand for the product, lowering its price at once leads to more sales, opens up an attractive field for new investment in expanding the manufacturing facilities and in general makes a change in the living standard which is small, but wide-spread and absorbed by society without painful readjustment.

On the other hand, there is a strong feeling on the part of the workers that the profits from these improvements should be realized more directly in the form of higher wages to the employees of the firm which makes the improvements and cuts the costs. The objections to this policy parallel the advantages of the other process in that the increased standard goes to a few, and

there is nothing in the process which tends to expand sales and thus spread the advantages over the whole population. There is the further difficulty that such a means of turning technical improvement to social advantage sets up varying wage scales within an industry as between those who can and cannot pay the new wage scale.

It is probable that the actual course of industrial history shows a combination of the two methods of distributing the benefits to society. In part, prices have been lowered. In part, wages have been raised. Perhaps the ordinary course, in the case of an individual new product or service, has been for the price to lower and the market to broaden during the earlier period of rapid development of a product, while later improvements are more likely to be distributed in wage increases.

To sum up our policies with respect to prices, we must hope for such governmental policies as will prevent the generation of much more money by governmental borrowing. We must endeavor to check ourselves and act as a restraining influence on our friends and business connections as relates to the resumption of future buying. We must endeavor by all means to seek a continued operation on our present price level if governmental and labor policies permit, and we must keep the conditions of the situation so clearly in our minds that we can discuss them effectively with the representatives of labor and of government.

Our relations with the government are the most important and the most difficult of all. Time was when business dealt with government openly or quietly for certain privileges as to taxes and tariffs. Having received or failed to receive what it asked for in these two respects, its dealings with the government were completed and it turned back to the problems of business pure and simple.

That time has gone by. We are deeply concerned for the sake of our businesses, for the sake of those who work for us, and for the sake of the general well-being of the country, with a large number of relationships between ourselves and our government. We are deeply concerned with the national budget. We are deeply concerned with monetary policy. We are deeply concerned, for the sake of the workers themselves, with governmental labor policy. We are disturbed by innumerable definite restrictions and threatened future limitations which will make more difficult the production and distribution of goods and the rendering of services. We need patience and faith, a recognition of the rights and interests of others and honesty in our adaptation to the situation. We need the same qualities in our relationship with our representatives in our state and federal governments. Persistence, intellectual honesty, and a continuing mutual education of both ourselves and our representatives are the only things that will tell in the long run. In such a time, business statesmanship will be as much at a premium as will statesmanship in labor and government.

The Contribution of Research to Industry

Dr. GARSON MEYER

Chief Chemist
Eastman Kodak Company
Rochester

THE PURCHASING department may well act in the capacity of interpreter for the facts and findings of industrial research. A well-trained purchasing agent can and should be mediator between those industries whose technicians may have developed new products or processes and their own technical staffs whose function it then becomes to intelligently apply them. The purchasing department by this cooperation may assist in reducing the time interval between the announcement of a new development and its adoption by industry.

It is no longer necessary to attempt to make a brief favoring industrial research. It is a significant fact that those industries which have weathered the storm of the depression most ably are those which have had well-organized industrial laboratories and have maintained scientific research during all of this period. A number of more progressive manufacturers are now considering research as a fixed charge.

The plastics industry, where research has been its very life-blood, has not only weathered the storm of the depression, but throughout the depression has shown marked growth. We but have to examine some notable developments made in glass technology—the new lenses which have longer “carry,” lenses which attempt to deflect light across a curve, glass brick and glass wall insulation in industry and home construction, and glass fabric, to appreciate that these products of research were largely developed during periods of depression.

It is significant that synthetic rubber reached its greatest development and commercial adoption, not while rubber was selling at a dollar a pound, but when it was down to about three cents a pound. The reason for this lies largely, not in the fact that new synthetic rubbers are competitive with the natural product, but rather that it found its niche in commercial adoption because of its significant properties.

Materials are fundamental to industry. Practically every manufacturing activity is directly or indirectly concerned with materials. Research laboratories have improved old and found multitudes of new materials which have become available to industry in recent years—high strength corrosion resistant



steels—improved synthetic plastics,—the use of these plastics in paints, varnishes, and other finishes,—lead leaf as a new ingredient for corrosion resistant paints,—precipitation—hardened non-ferrous alloys—high strength cast iron—new die casting alloys—magnesium and beryllium alloys—high strength glass—building materials—insulation materials—high purity metals now available for commercial use such as zinc and aluminum—synthetic fabrics and uniform dyeing of rayon—new medium for polarizing light—aluminum foil sheets for insulation—new solvents (acetamide) and aluminum alloys of sufficient strength to be used in bridge construction. The more rapidly the purchasing agent exploits these newly available materials the more rapidly will the purchasing department be recognized as a source of income.

Do not think that I am intimating that all new materials should immediately be adopted into your industry. It is necessary that the purchasing agents insist that their technical divisions properly study all new materials which are being suggested to them and that a complete report be rendered to the purchasing departments apprising them of the actual properties of the material—keeping always in mind the quality standards and manufacturing conditions of their own plant. In this way, and in this way only, can the purchasing departments intelligently formulate opinions regarding the relative merits of materials submitted

to them—sometimes by over-zealous salesmen. With reports on their desk from the technical departments indicating the true properties of the new material, the purchasing departments can then determine whether the new material reflects sufficient cost interest or whether it has other virtues that qualify it for adoption.

Research which is constantly changing material products and processes must be reflected in constantly changing specifications for material. A good industrial research department should actively be studying materials and revising its specifications accordingly. In writing these specifications it is desirable to anticipate wherever possible those improvements which are being reported through technical developments. Specifications thereby become one way of introducing new or improved material into industry.

Great care must be exercised in writing proper specifications. We all know that there are a number of manufacturers who actually profit materially from the rejects of other plants. Successful specifications are frequently a compromise in order to take into consideration not only your own requirements, but also the limits of the manufacturer of the raw materials. It may be necessary to modify your own production methods and requirements so that the loss to the vendor, through specifications which are too rigid, may be kept at a minimum.

Technical departments can be of great assistance to purchasing departments by writing proper specifications and making sound examinations of submitted materials. In our own plant we try as much as possible to adhere to so-called "performance type" of specifications rather than composition type of specifications. Composition type of specifications such as are issued by U. S. Bureau of Standards, the Navy and Army departments are made primarily for general consumption and wide open competition. A major defect in the composition type of specification lies largely in the fact that we penalize ourselves by not taking full advantage of new developments in the art.

We are not interested particularly at just what temperature aluminum may be drawn, exactly what its chemical analysis may be, just how many passes it will receive at the mill, but we are vitally interested to know that the aluminum shall have certain characteristics when we receive it; that it will perform certain operations in our own plant successfully; that it will withstand the laboratory tests which we have developed to indicate to us how the aluminum will act within our plant, and how it will act after the customer finally buys our finished product. We do not indicate to the manufacturer just how we want him to manufacture a material under production methods with which he is more familiar than we are. However, should you specify that your paints, for example, must have certain coverage, must withstand certain baking operations, have certain aging and durability qualities, must withstand specific handling within your own plant, must have corrosion resistant properties, and

moisture and perspiration resistant qualities—you then in effect tell the vendor what you wish as an ultimate product, and permit him to use all the art available to him in obtaining the results.

We must recognize, though it is unfortunate it is nevertheless true, that salesmen calling upon you are not as fully apprised of the properties of their own products as they should be, and even less with your procedures, your requirements and the limitations in your own manufacturing plants. Quite frequently statements are made regarding the quality of a submitted product which may not prove to be so in actual practice. The salesman's potential savings vanish unless intelligent, scientific study is made to properly judge materials. A comparable basis for examination must first be found so that materials of a similar type and not of a dissimilar nature shall be compared with each other.

Conditions such as these indicate the necessity of having a technically trained staff to assist the purchasing department in making critical analysis to see that examinations are being made on a common basis. It is unfair to state, for example, that the newly announced water white plastic is a better material than glass for when both of them are dropped on the floor the glass will break whereas the plastic will not. Certainly this plastic would make a poor material for our lenses.

One of the very important functions of a research department, be it an engineering or chemical department, is to keep the purchasing department constantly abreast of the methods in production, difficulties encountered, and where material and rejection costs are high, and also to keep the purchasing department informed of new material developments so that they may properly interpret them when they are faced with an overenthusiastic salesman. If purchasing departments would recognize their true function and relation to the rest of the organization they would soon recognize the assistance which technical staffs can render them.

A very unfortunate situation does exist in many organizations where purchasing departments feel that laboratories are encroaching upon their prerogatives. If we are fair with ourselves we will soon appreciate that the function of the purchasing department is sufficiently great and important so that they need not fear any encroachments by other departments within their organization. If the purchasing departments would closely watch the markets and study their own problems they would be sufficiently well occupied so that they should not feel reluctant to transfer the study of specific materials to technically trained departments within their own organization. It certainly is no reflection upon their lack of knowledge if the purchasing agent admits to representatives of vendors that they are either not entirely familiar with the vendor's material or with their own organization problems and refer their problem to a member of the technical department.

Recently a vendor visited our purchasing department to sell them some spring material. In routine

manner our representative asked him wherein his materials were any better than the materials we now use. After a bit of sparring, he informed our purchasing representative that his principals had developed a procedure whereby their springs were heated to about 200 deg. F. after plating and that the steel used in their springs was of such a nature that the hydrogen embrittlement disappeared. He talked at length about this new procedure developed by his organization and before long convinced our purchasing department that they were a progressive forward thinking organization. The purchasing department representative informed the laboratory of this supposedly new development. The laboratory referred him to operation sheets showing that this heat treatment was a routine operation in effect on all plated or pickled springs at our works since 1927.

I mention this not to indicate that the laboratory has a more intelligent group of men than the purchasing department, but rather to emphasize the fact that heat treatment of springs is definitely a function of the metallurgist and that it is no reflection on the purchasing department in any organization if it is not familiar with the fine details of production procedures. It would be just as unscientific for the metallurgist to discuss prices, market trends or contracts with the vendor. It is a function with which the metallurgist has no daily contact. From a purely economic point of view it is not advisable to have the purchasing department function both as a technical department and still function as an efficient purchasing department.

Take the industrial chemists into your confidence. Demand of them that they ferret out and study new and improved materials whose properties may be such that they can be adopted by your organization with an ultimate reduction in cost or improvement in product. With materials being used by highly skilled craftsmen and highly paid labor it is of greater importance now than ever before that optimum results be obtained from the materials they use. Make sure that you have the benefit of the chemist's technical knowledge in examining and studying materials submitted to you by vendors to determine their relative merits. By doing this, you not only save time and money and bring into your plant new and beneficial materials or processes, but will in effect issue notice to vendors that you are interested in new developments and assure them that submitted materials are having unbiased scientific and accurate studies in laboratories with a genuine mutual interest as the basis. Your manufacturing departments will also feel that they are not being used by the purchasing department as experimental laboratories for a host of untried materials. They will recognize that when a material is finally submitted to them they have the assurance that it is one that has been thoroughly examined and should meet most, if not all, of their production requirements and limitations, and that the finished product containing these new materials will withstand the rigorous examination of a critical public.

JUNE 1937



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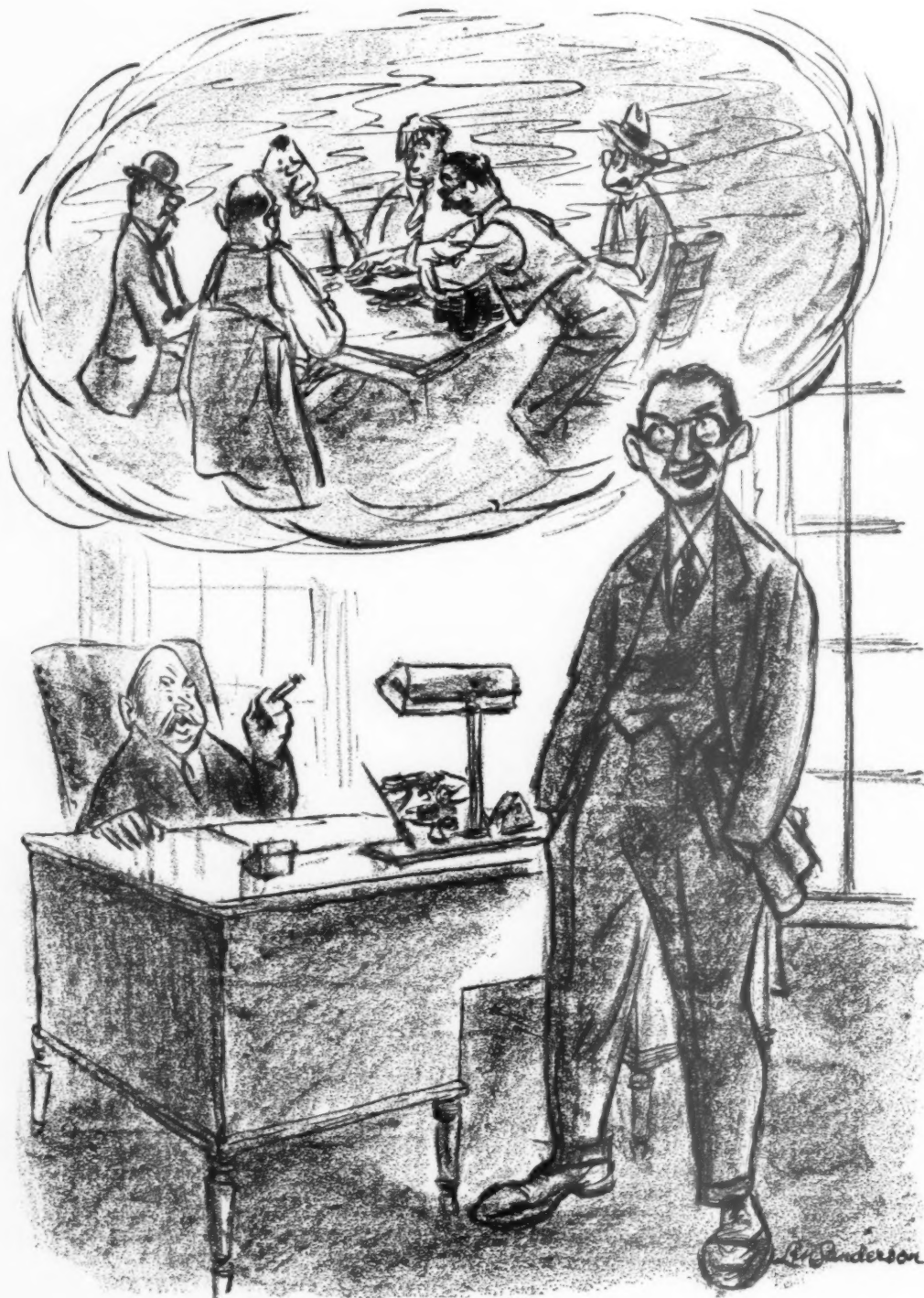
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PAGE 15



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SILHOUETTE STUDIES

15: George Porter Brockway

ASSISTANT to the chief engineer at the New York works of an active and highly regarded company before the age of thirty, and only six years out of college; entrusted with a full share of responsibility, and engaged in congenial work that gave scope for the application of his technical training and his natural inclination for the sales approach—it was a situation that many a young man would have viewed with a good deal of complacency. But to the thoughtful and ambitious young engineer who held the job, and whose recent marriage had given him a special incentive to look ahead, it was evident that there were other factors to consider. His immediate superior was only three or four years older than himself, and in excellent health. Observation of company policy indicated that it was far more likely for a promising executive to be transferred from the main office at Milwaukee to fill a vacancy in the New York organization than for a reversal of that procedure. So he went frankly to the management, presented his case, and asked for suggestions that might hold a larger opportunity.

Management appreciated the reasonableness of this request. They considered the matter, and suggested that the purchasing set-up of the company wasn't all that it might be. Would the assistant engineer undertake the buying job, rebuilding from the bottom up if necessary, and see what could be accomplished? He would. And that's how the new president of the National Association of Purchasing Agents got his start in purchasing, nineteen years ago.

GEORGE PORTER BROCKWAY—universally known as "Porter" until his first business cards, made up without consulting him, intro-

duced him to the business world as "George P."—was born January 28th, 1887, at the town of Wolcott, not far from the shore of Lake Ontario in upstate New York. This little community of thirteen hundred souls, and his grandparents' farm at the outskirts of town, were the scene of a normal, happy and active boyhood. There was a brief interlude in Baltimore, where his father had taken a position with the Ryan-McDonald Steel Works, but the depression of '93 brought the family back to Wolcott and the grocery business.

The growing boy managed to take part in most of the things that were going on. With the aid of an instruction book, but without benefit of formal teaching, he mastered the clarinet and was invited to join the local band—which was good enough to travel to Kingston and play for Queen Victoria's birthday celebration when George was only thirteen. When he was a little older, he played third base on the High School nine and center field on the town team. In 1906 he graduated from Wolcott High School and Leavenworth Institute, and took post graduate studies the following year.

IT WAS EVIDENT that a college education would have to be financed largely through his own efforts. However, with characteristic ambition and determination, he enrolled with the class of '11 at Cornell University and promptly found himself in the midst of his favorite activities, playing in the University Cadet Band and out to win a place on the freshman baseball team. An injury to his hand soon forced him to give up the latter sport—a deep disappointment at the moment, but probably all for the best, as his time during the next four years was pretty thoroughly occupied in

playing with various orchestras and bands, operating a laundry agency, and turning his hand to any job which promised an extra dollar to meet expenses. His summer vacations were spent working in a canning factory at Wolcott. Meanwhile, he kept up with his classes, and also joined the Iswaza Club, now a chapter of Lambda Chi Alpha fraternity.

A year was lost through illness, but he came back to complete his course with the class of '12, won the post of Chief Musician with the Cadet Band, and received his degree in mechanical engineering.

ON JULY 1, 1912, only a few days after graduation, he laid aside the trusty clarinet forever, and went seriously to work as apprentice engineer for the New York works of Cutler-Hammer Manufacturing Company, in the electric heating department. The experience was excellent, the advancement satisfactory up to a certain point, and then ensued the incident recounted above, by which Brockway first became a purchasing agent.

He went at the new job studiously and methodically, adding to his technical foundation a knowledge of commercial practices and values. It was no hurried job, but soundly and firmly established. It got results.

For about four years, this development work was carried on, and Brockway decided that the time had come for another review. He had become deeply interested and enthusiastic about the possibilities of purchasing work, and the project had been eminently successful, fully justifying the vision of management and his own efforts. With calm good judgment he took stock of the situation, and came to the conclusion that the job had been brought to a proper balance with the rest of the

organization. He liked purchasing, and he wanted to get ahead, but not at the expense of attaching undue importance to a function which he honestly believed was now serving its purpose in that company adequately and efficiently.

Again he went to the management and presented the case. And again management showed its appreciation of his attitude. They would be glad to retain his services, and he was invited to stay on as long as he desired, but if a larger opportunity should present itself he was free to go, and they would try to help.

That opportunity came in the spring of 1923. The American Optical Company of Southbridge, Mass., had a purchasing department and was fully aware of the importance of that division. Leaders in a rapidly developing technical industry, facing a period of expansion, and organized with a somewhat involved corporate structure, the company was looking for a man to develop the department in such a way as to cope with the situation that they saw ahead. Brockway's qualifications, his experience and record, fitted perfectly into the picture. On the first day of March, he went to Southbridge as Manager of Purchases.

THE RECORD of the fourteen years since that time shows the accuracy of that foresight and the wisdom of that choice. In an organization necessarily headed by technical men, and operating under conditions that have steadily grown more complex and exacting, both from the scientific and the business angle, the purchasing department functions smoothly, intelligently, and efficiently from the very first con-

ference on new material or equipment to the final step of the transaction. The department makes the purchase, controls the receipt of material and the general stores, and when the invoice is passed along to the accounting department it is ready and authorized for payment.

One of the first things Brockway did on entering purchasing work was to become affiliated with the New York Association. He was serving as vice president of that group at the time of his transfer to Southbridge. Changing his membership to the New England Association, he started again in the ranks, but was soon drafted for office. At the time of the N.A.P.A. convention at Boston in 1933, he was president of the local association, and was chosen a year ago to represent District 9 on the National Executive Committee, where his thorough-going ability, sound common sense, and friendly democratic personality quickly won the confidence of his associates and led quite naturally to his selection for the leadership of the Association, without the remotest trace of political activity. That action came as a simple and sincere tribute to the man.

GEORGE IS inherently reticent, but self-confident and ready to accept responsibility for any cause in which he believes. He comes into office not as the proponent of any special program, but as one who believes in growth by sound development toward a well defined objective, and in leadership by education; who builds without tearing down; who appreciates the time factor required in worthwhile accomplishment and is willing

to take whatever time is necessary that the foundation and the structure may be firm. His whole career in business and in association work over nineteen years bears testimony to the solid worth of such a policy.

His technical training has made him logical, studious, judicial, progressive, systematic, a man who values deeds above words, but who has withal the ability to express himself clearly and concisely.

Aside from his purchasing affiliations, he is a member of Rotary, Masonic Lodge and Chapter, the Southbridge Technical Society, and the Cohasset Country Club. He is known as a consistent and effective worker on the business side of the Y. M. C. A., the hospital drives, and similar projects of public interest in his home city.

ON OCTOBER 8, 1914, George married Miss Flora Buckminster, whose father was manager of the canning factory where he worked summers during his college years. The first lady of N.A.P.A. is a gracious and attractive hostess, wife, and mother. Their family consists of a daughter, Barbara Lillian, 19, who has just completed her freshman year with honors in the physical education course at Russell Sage College, Troy, N. Y., and a son, George Richard, 9.

Their home is at Southbridge, but their particular pride and pleasure is found in the beautiful camp on Lake Mashapaug, just over the Connecticut line, where they delight to share with their friends the calm beauty and peace of nature. The development of this camp home, and the quiet joys of a boat, a line, and a pipe, have become George's favorite recreation.

Life has not been easy. It has had its full share of hard work and of personal sorrow. But there is a lively twinkle in George's eye and serene good nature in his disposition, for he has found happiness in his boyhood, his family, his friends, his work, and his business associations. To know him and to work with him is to share in that genial and optimistic outlook.—S. F. H.



THE NEW VICE PRESIDENTS

At Large

CARLETON AUGUSTINE KELLEY, Purchasing Agent of the Nevada-California Electric Corp., Riverside, California. A native of Iowa, graduate of Amherst College, Massachusetts, in 1895, law student at Chicago, and practising attorney at Denver. Saw active duty with the Colorado State Guard, which he headed for eight years as Adjutant General for the State. Went to California in 1913 with the Southern Sierras Power Co., predecessor to his present company. Organized the purchasing department and has directed it ever since. Joined the Los Angeles Association in 1920 and became president in 1933-1934. Elected to the N.A.P.A. Executive Committee two years ago as Vice President for District No. 1. Chosen President at the New Orleans convention a year ago, he has just completed a highly successful year, during which he has personally visited every district. His home is at Riverside, California, and he has two daughters of college age.

District No. 1

EDWIN RUTHVEN MILES, Purchasing Agent and Director of Budget for his native State of Utah. Born at Smithfield, and graduated from Logan High School, he spent the years 1905-1907 as a Mormon missionary in England. Studied economics and law at George Washington University, graduated from the University of Chicago Law School in 1912, practised law at Idaho Falls, Idaho, for three years. Then returned to Utah to carry on his father's varied business interests, which were incorporated as E. R. Miles, Inc., and the Smith Miles Farm Corp. Mr. Miles is president of both companies. Appointed State Purchasing Agent in 1929, he found the department hampered by inadequate legislative authority and official neglect. This situation he met by rewriting the

basic statute establishing its status and authority. The new law was passed in 1933. In the latter year he became Director of the State Budget, and likewise rewrote the law covering budget control, which was enacted in 1935. Joined the Utah Association in 1929, and has served as its president; also active in the Governmental Buyers Group of N.A.P.A. He has found time to assist in organizing the business management of the county schools, and has been Lieutenant Governor of Kiwanis for the Northern Utah district. His home is in Salt Lake City; has two daughters—Alys Ruth, 17, and Patricia, 13,—and a son, E. R. Miles 4th, 15. His chief recreation is hunting.

District No. 2

ROBERT EDWARDS WHITTEN, Purchasing Agent for Gifford-Hill Co., Dallas. Born at Corsicana, Texas, in 1903, Bob is the youngster of the new Executive Committee. He entered the employ of Gifford-Hill in the accounting department in 1921, immediately following his graduation from business school. Purchasing was not centralized at that time, but when the centralized organization was put into effect three years later, Whitten was named purchasing agent and has continued in that position ever since. Joined the Dallas Association about 1926, took an active part in the work, and became president in 1935. Life has been too busy for any great amount of outside interests, but he plays at golf and was for a time affiliated with the Junior Chamber of Commerce until he resigned to devote himself more intensively to the purchasing group. He lives in Dallas, and has two children—Robert E., Jr., 6, and Betty Jean, 2.

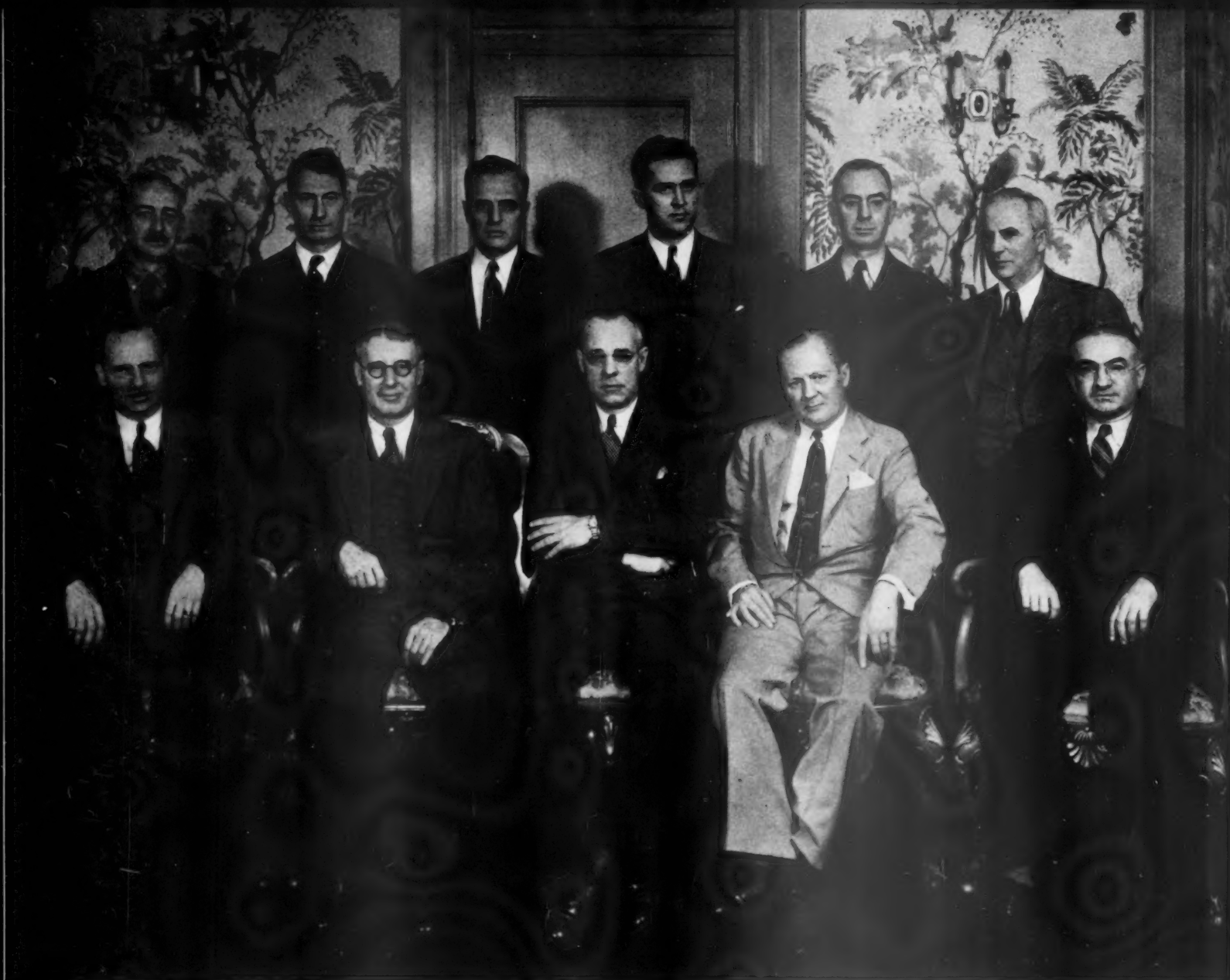
District No. 3

JOSEPH WILLIAM NICHOLSON, Purchasing Agent for his native City of Milwaukee. Graduate of Milwaukee State Normal School.

School teacher (and jitney-driver and auto mechanic on the side), automobile and tire salesman, Joe's first ambition was for a musical career, being equipped with a fine tenor voice and notable talent as an organist. He came into purchasing work as assistant City Purchasing Agent in 1918, largely on the strength of his mechanical training and experience with automobiles. He was advanced to his present position in 1923. President of the Milwaukee Association in 1925, and for several years chairman of the Governmental Purchasers Group of N.A.P.A. A militant advocate of the efficiency of centralized purchasing in public business, of which his own department is an outstanding example, he has addressed civic groups and business organizations in a score of cities on this topic. Established a course in purchasing at Marquette University in 1925, led the committee which successfully sponsored the Bureau of Purchase for the State of Wisconsin in 1929, and served as a member of the Consumers Advisory Board of NRA. Cooperated with the American Municipal Association, the U. S. Conference of Mayors and the Municipal Finance Officers Association in the interests of centralized buying. Winner of the second award in the 1937 N.A.P.A. prize contest, he promptly appropriated the prize money to the musical education of his talented 17-year old daughter, who is already a composer of promise and more than local reputation. She enters the Music Conservatory of Northwestern University at Evanston this fall.

District No. 4

FRANCIS HENRY MISSIG, Division Purchasing Agent for the Aluminum Company of America, at Detroit. Born at St. Johns, Michigan, the oldest in a family of ten children, he moved to Detroit in boyhood, attended high school in that city, and went to work in the printing



Seated (left to right)—F. H. Carter, Baltimore; C. A. Kelley, Riverside, Cal.; G. P. Brockway, Southbridge, Mass.; J. W. Nicholson, Milwaukee; Benjamin Baylis, Rumford, R. I. *Standing (left to right)*—F. H. Missig, Detroit; J. E. O'Brien, Cleveland; J. M. Alexander, Chattanooga; R. E. Whitten, Dallas; E. R. Miles, Salt Lake City; W. S. Barber, Toronto.

department of the Acme White Lead & Color Works. Supplementing practical experience with correspondence courses in advertising and typography, he got his union card before he was 21, and then finding that he was already earning as much as those who had spent a lifetime at the trade, gave it up to join his father in the building business. Shortly afterward he became time clerk and stock room clerk for the Aluminum Company. Served on the Mexican border in 1916 and won a regular army commission as 2nd Lieutenant of Infantry. The following year he went overseas with the 31st Michigan Infantry, where he rose to the rank of Captain in the course of winning

five battle bars and a wound stripe commemorating the engagement at Chateau Thierry. After eight months with the Army of Occupation, he returned to Detroit and the Aluminum Company, this time in the traffic department and follow-up. Appointed purchasing agent in 1920. Joined the Detroit Association in 1923, was elected a director in 1926 and has served continually since that time, becoming president in 1934-1935. He has three sons—Francis, Jr., 20, now serving his business apprenticeship with the Aluminum Company; Gerald, 16, a student at Denby High School; and Raymond, 13. Enjoys bowling, golf and fishing, and has been active in the American Legion

as Post Commander and as drillmaster for the championship drum corps.

District No. 5

WALTER SCOTT BARBER of Provincial Paper, Ltd., Toronto. Mr. Barber was born at Marquette, Mich. The family moved to Canada when he was about five years old. He attended the Owen Sound Collegiate Institute and has spent his entire business life in the paper industry. His first job with Provincial Paper (1913) was in production work. He came to the Toronto offices in 1918 and took over the purchasing work two years later. In addition to his purchasing

Continued on page 72



Coke and By-Products

C. J. RAMSBURG

Vice President
Koppers Company

THE BY-PRODUCT COKE OVEN as built today is the result of years of study and development in an effort to secure not only the best quality of coke but the maximum yield of other valuable products. The ovens are built in batteries, the number of ovens to a battery and the number of batteries proportioned to the amount of coke required. The individual ovens are about 40' long, 14' high and 16" wide, and have a capacity of approximately 17 tons of coal. The oven chamber is heated by gas burned in vertical flues along the oven walls and the heating is so regulated that the coking operation proceeds at the rate of approximately one inch per hour, under which conditions about 26 tons of coal per day (producing 19 tons of coke) would be carbonized.

When the coal is placed in the oven the volatile constituents of the coal immediately begin to flow into a space above the coal, from which they are drawn out and passed through the various by-product recovery apparatus. From the 26 tons of coal in an oven per day, we secure roughly the following products:

300 M. cu. ft. of gas, of which 110 M. cu. ft. may be returned to heat the ovens.
210 gallons of coal tar.

600 lbs. of sulphate of ammonia.
75 gallons of light oil, containing benzol, toluol and solvents.
150 lbs. of recoverable sulphur, and such other products as byanogen.

In America in 1937, approximately 75 million tons of coal will be put through by-product coke ovens. This may register better, if I say that this represents one car of every 8 mined, or 3 cars of coal per minute, night and day.

In the year 1913, before the big development in coke oven construction began, only 25% of the coke used was by-product coke; today by-product coke amounts to over 95%.

The largest and most important use for coke is in the manufacture of pig iron in the blast furnaces of steel plants and merchant iron plants.

Before the days of the by-product coke oven using bee-hive coke and gas made in producers, it was necessary to use 3,600 lbs. of coke and coal per ton of steel produced. With the modern by-product oven, this figure has been reduced to below 3,000 lbs.

Because of the products such as tar, sulphate of ammonia, benzols and gas, the credit for these is such as to be an important factor in reducing the cost of coke and therefore of pig iron and steel.

Another important use for coke is in the foundry, and of late years its use as a superior domestic fuel has assumed important proportions.

Second only to coke in importance is the black viscous liquid known as coal tar, of which there will be made

in 1937 nearly 600,000,000 gallons. When the steel or gas plant has produced this material and put it in a tank car, it goes to another important industry, namely the Coal Tar Distillation Plant. The importance of its products are impressive. From coal tar come our foremost bituminous road building materials, and from the present outlook, 150,000,000 gallons will be used in 1937 to build 25,000 miles of road. In addition to making a road easy and cheap to build and easy to maintain, it has the great advantage of being highly anti-skid in wet weather and dustless in dry weather.

From coal tar there is distilled creosote, the chief use of which is in wood preservation. In addition to this there will be a large quantity imported. Creosote is being used in greater and greater quantities in the preservation of all types of timber, and this use, while very much less than for railroad ties, is rapidly increasing. It is being realized more and more that no outside timber should be used without the preservative treatment, and that trestles, mine timbers, piling, poles, docks, etc. can secure many additional years of service when utilized.

The total amount of coal tar recovered amounts to about 4% of the original coal. The total amount of materials in this coal tar which are of vital importance to the dye industry, the chemical industry, the plastic industry and the drug industry are derived from naphtha alone, benzol, toluol and solvents, light oils in the tar, the total amounting to less than 2% of the original coal. But this 2% is of enormous importance.

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Tin, Lead and Zinc Markets

THE CHANGES WHICH have occurred during the last few months in the principal non-ferrous metals have been so remarkable that had anyone a year ago made an accurate forecast of what the situation would be in the early part of 1937, you would probably have looked upon his remarks as being the irresponsible visions of some impractical optimist.

To have said in May, 1936—or for that matter even in September—that the heavy surplus stocks which had been overhanging the markets for years would be practically all cleared away by the first quarter of 1937, and that full employment of production facilities under the added stimulus of rapidly rising prices would barely prove sufficient to meet demands—just would not have seemed to have made sense. At that time copper, lead and zinc were only slowly recuperating from their various disorders and all of the specialists were prescribing that the markets should be kept in a state of absolute quietness in order that return to health should not be interrupted by any unnecessary action or excitement.

You remember, of course, when some of the producers thought copper was strong enough to take a short walk from $9\frac{1}{4}\text{¢}$ to $9\frac{1}{2}\text{¢}$ but for two months it was deterred from doing so by one authority who insisted that it actually demonstrate its strength before it set out. And then four months elapsed before it was permitted to take another very short walk from 9.50¢ to 9.75¢ . During that time its condition was improving but the producers made it possible for consumers to buy everything they wanted, and for a while purchasing agents were in the unnatural but happy position of not running any risk of missing their market because sellers kept their order books open for a day or so at the lower price for all bona fide users to get aboard. It is hard to realize that such was the situation less than a year ago.

C. S. J. TRENCH

Editor

American Metal Market,
New York

At the Zinc Institute meeting in April, 1936 it was stressed upon mine operators and smelters that while some headway had been made in bringing the industry back to a rational state, continued cooperation in the matter of restriction of output was absolutely essential, or otherwise the industry would suffer another set-back. By careful nursing the stocks of zinc had been brought down to a level where they were equal to about two months' deliveries, but during the Summer showed a tendency to rise, and one or two dollars was lopped off the price as a warning to producers of what to expect if they did not keep output down below 45,000 tons a month.

The reduction of the great surplus stocks of lead which had continued to mount after the worst of the depression had passed (the peak of 240,000 tons was reached in August, 1934) had been insignificant up to the end of last Summer.

Although tin had gone through a course of rationalization under an international control agreement, sponsored by the Governments of the countries which furnish 85 to 90% of the world's output, and although the total visible supplies had been reduced to a point where they represented less than six weeks' requirements (including tin afloat and stock in the Far East, thousands of miles away from the principal consuming centers) even that industry did not feel it was on safe ground a year ago. Until late in the Autumn buyers had the opportunity of contracting for tin, both spots and futures, in the low 40's. Some who did, admit their advantageous purchases were due as much to good fortune as to good

judgment. The market on February 1st was 50¢ with production running enough ahead of consumption to inspire some dealers to petition for a reduction in export quotas, and this not being granted, the outlook was for smooth sailing ahead. Many figured that it would hold somewhere near this 50¢ mark, but six weeks later where was it? At 68¢ .

Many different factors have contributed in bringing about a revolution in the situations and in market values of the metals.

Firstly, and foremost, was the amazing expansion in American industry. The domestic deliveries of each—copper, lead and zinc, during the fourth quarter of 1936 were about 50% greater than during the first quarter, and buyers' engagements for future deliveries clearly indicated the expectation of a still greater expansion this year.

Secondly, there was a general return of confidence and buyers all over the country departed from a hand-to-mouth policy and began booking for requirements for three and six months forward. Consumers do not consider themselves to be speculating when they radically change their buying policy, but from a market standpoint a change from a two to three week's coverage to a four to six months' coverage by consumers has as great or greater effect as the transfer of the operations of professional operators from the short to the long side.

Thirdly, we like to buy things when they are going up. Goods begin to look much better to us when they start to become scarce, than when they were plentiful.

Fourthly, at times we are very much influenced by the actions and opinions of others, and when the prices of metals in the foreign market started to climb rapidly to levels twice as high as those of a year ago, it is small wonder that domestic buyers became excited. The domestic producers were like-

wise affected—for whereas only a year before their continuing problem had been to reduce surplus stocks to reasonable and manageable proportions, they were suddenly confronted with the amazing situation of having to lift prices against their will and judgment in order to keep needed supplies at home.

During the "March show" there was a good deal of talk of the action and reaction between London and New York, but it was the foreign market which furnished the impetus for the world-wide advances and also invented the explanations which were said to justify what was happening. Re-armament and the gold price were the wands that were chiefly waved over the market and for a time they brought about a daily growth in values. Then the gold scare came along, and President Roosevelt made a brief reference to the increase in the cost of materials in durable goods, which caused the foreign speculators to take to their heels.

The accompanying table briefly outlines what the position was at certain key periods. This shows that a great improvement has taken place in the statistical positions of copper, lead and zinc, whereas in the case of tin the visible supplies in relation to current deliveries are slightly greater than a year ago. It so happens that tin was the article which in March was tipped to stage the most sensational performance of all, although based on the position there was less justification for the advance in the price of this metal than any of the others.

Although copper, lead and zinc received substantial tariff protection and although the domestic position of these metals improved to a greater extent than the world's position, the advance in domestic prices was not nearly so great as the advance in the foreign prices. Using as a basis the prices prevailing a year ago, the high levels reached in March showed the following advances:

	Domestic	Foreign
Copper	80%	115%
Lead	68%	125%
Zinc	53%	147%

Tin					
	New York Straits	London Standards	World's Visible Supply	Deliveries	Ratio
Apr. 30, 1936	46.62 ¹ / ₂ ¢	£207.15.0.	17,000	12,000	1.4
Oct. 30, 1936	46.00	209.10.0.	19,000	13,000	1.5
Dec. 31, 1936	51.70	233.0.0.	24,000	15,000	1.6
Mar. 1937—High	68.00	312.0.0.	24,000	15,000	1.6
May 14, 1937	54.75	249.0.0.	25,000	—	—

Copper					
	Price		Domestic		Ratio
	Delvd. Conn. Electro.	London Standards	Stocks	Deliveries	
Apr. 30, 1936	9.50¢	£36.17.6.	234,000	51,000	4.6
Oct. 30, 1936	10.00	42.13.9.	178,000	77,000	2.3
Dec. 31, 1936	12.00	49.7.6.	161,000	76,000	2.1
Mar. 1937—High	17.00	79.5.0.	121,000	95,000	1.2
May 14, 1937	14.00	61.15.0.	100,000	88,000	1.1

Lead					
	Price		Domestic		Ratio
	New York	London	Stocks	Deliveries	
Apr. 30, 1936	4.60¢	£16.2.6.	221,000	40,000	5.5
Oct. 30, 1936	4.80	19.10.0.	183,000	59,000	3.1
Dec. 31, 1936	6.00	28.7.6.	172,000	52,000	3.1
Mar. 1937—High	7.75	36.7.6.	137,000	63,000	2.2
May 14, 1937	6.00	22.18.9.	—	—	—

Zinc					
	Price		Domestic		Ratio
	New York	London	Stocks	Deliveries	
Apr. 30, 1936	4.90¢	£14.18.9.	81,000	42,000	1.9
Oct. 30, 1936	4.85	15.12.6.	69,000	54,000	1.3
Dec. 31, 1936	5.45	19.18.9.	45,000	60,000	.7
Mar. 1937—High	7.50	37.0.0.	18,000	60,000	.3
May 14, 1937	6.75	21.17.6.	14,000	56,000	.2

Had domestic producers wished to fully avail themselves of the tariff protection, and had they been willing to play the game as it was being played in London, the price of copper in this market could have been advanced to above 20¢, lead above 9¢ and zinc to nearly 10¢. It is greatly to the credit of our producers that they dismissed from mind the duty paid equivalents of the foreign price and after slowly following the rise abroad, availed themselves of the first opportunity to lead the home market back to more healthy and sensible levels. Fortunately the high prices of 7³/₄¢ for lead, 7¹/₂¢ for zinc, 17¢ for copper and 68¢ for tin did not last long enough to do

any real damage, and I think there are few in any branch of the industry who in any way regret the reactions which have since occurred. It is the speculators who have had to pocket the losses and who will have to pay for the party which was designed to be for the account of Mr. Consumer.

We have seen so many supposedly impossible things happen that it is risky to predict that anything is impossible, but it would seem safe to set up a budget on the supposition that 1937 will encounter no natural or artificial famines of copper, lead, zinc or tin and that the Humpty Dumpty markets of March cannot be put together again.

New Developments in Glass

R. A. MILLER

**Technical Sales Engineer
Pittsburgh Plate Glass Co.**

THE VARIED USES to which glass is put, has, of necessity, required the development of many different types of glass, and sometimes several types for the same general application. The vogue of the ultra-violet ray transmitting type seems to have very nearly passed, since its immediate value seems to have been much overdrawn. Some of these glasses offered a permanent ultra-violet transmission of approximately 50%, which sounds like a very considerable amount. However, when we consider that the ultra-violet is usually less than 1% of the solar energy and that, dressed as we are now, less than 1% of our body area is exposed to the ultra-violet, it becomes evident that the actual utility of ultra-violet transmitting glass is exceedingly limited. On the other hand, high transmission of visible light is exceedingly desirable in some instances, and to meet this demand the Pittsburgh Plate Glass Company has developed "Crystalex" Plate Glass, which transmits better than 91% throughout the entire range of visible light. Regular Plate Glass transmits approximately 89%, but this transmission falls off very rapidly toward both the blue and red ends of the spectrum.

The development of air conditioning has required the simultaneous development of new types of glass which shall absorb a considerable portion of the solar heat energy, while transmitting a large proportion of solar light. To meet this demand, there are available several different glasses, among which may be specifically mentioned Solex Plate Glass, which has a visible light transmission of approximately 75% and a solar heat transmission of something less than 45%. A building glazed with this glass will be several degrees cooler than a building glazed with ordinary glass, because the solar heat is absorbed in the glass itself, rather than being absorbed by the

furnishings within the building. This permits of the dissipation of a large amount of the heat to the exterior of the building and results in considerably greater comfort.

"One-Way Vision" glass has come very much to the fore of recent years. There is no such thing as a glass through which one can see in only one direction. The direction of vision through any such so-called "One-Way Vision" glass depends absolutely upon the light intensities on opposite sides of the glass. It is always possible to see, from the darker side, objects on the more highly illuminated side of the glass, while the converse is not true.

There are available mirrors which permit you to see, by daylight, what your appearance will be by artificial light, and conversely there are mirrors which will permit you to see by artificial light what your appearance would be by daylight. Special glasses have been developed for the protection of documents against the deteriorating effects of ultra-violet light, while still another product is opaque to X-ray while perfectly transparent to visible light.

Colored glasses are produced by introducing into the glass batch the oxide of the appropriate metal to produce the color desired. Some of these colors are very evanescent and are easily destroyed by slight heating, while others are developed only by a reheating of the glass, which may originally have been perfectly clear.

Structural glasses are coming largely into vogue today. These glasses can be obtained in all thicknesses from $\frac{11}{32}$ " to $1\frac{1}{4}$ " and in a wide variety of colors. Their application to wainscoting and other types of wall facing is becoming very

much better known and their use is spreading rapidly. The newer types of structural glass, in the shape of glass blocks, are being widely exploited and their utility is generally admitted. The product is still so new, however, that the various types of shapes, opacity, etc., which may be desired, still need to be developed. The methods of setting glass block walls and erecting glass block buildings are receiving very careful and thorough consideration and the results should prove eminently satisfactory.

In the field of heat insulation, glass has only just recently begun to come into its own. The development of such materials as spun glass, the hollow glass blocks mentioned just above, and of multiple glazed units, all offer considerable food for thought to the heat engineer. The almost universal use of double glazed units in the equipment of the modern, high speed train and the more modern type of the usual railroad coach, are only indicative of the very wide utility of these units for all kinds of window glazing. Such units ensure almost complete freedom from fogging, even in the extremes of cold weather, and permit a real comfort, even though one sits directly below the window. Hollow glass blocks have an insulation value almost equivalent to a 9" brick wall, while having very nearly the same translucence as the more usual types of factory glazing. Their utility as curtain walls in modern building is very nearly self-evident and their use should result in much more satisfactory illumination. The combination of glass blocks with regular window setting offers many attractive possibilities.

Spun glass, as recently developed, is being exceedingly widely used as an insulating material, and is obtainable in many different values. The application of this product to fabrics for special purposes is gaining

Purchasing Agent Convention Chairmen

MAY 1937



The Convention Committee, as seen by the artist for "William Penn Points," the magazine of the convention headquarters hotel.

some publicity, but its universal application to clothing and similar materials is almost wholly a matter for the future. In the manufacture of special fabrics for such things as filter presses, the material offers many attractive features. It will sustain tremendous pressures and is very highly resistant to the various chemicals to which it may be exposed. The size of the filaments may be approximated by the fact that filaments approximately one-sixth of the diameter of the linen filaments have approximately the same softness as linen, filaments approximately one-sixth the diameter of cotton fibers seem to have the same softness as cotton and it is supposed that filaments one-sixth of the diameter of a silk filament would have the softness of silk. However, the least which has yet been produced is approximately one-third the diameter of a silk fiber, so that considerable distance still remains to go. This material is being very widely used in the insulation of battleships and other maritime equipment, and

is also finding considerable application in the insulation of homes.

The exceedingly wide publicity given to the recent manufacture of the 200" reflecting disc for the projected telescope at Mt. Palomar in California has resulted in very considerable interest in optical glass. Essentially, optical glass is very much the same as Plate Glass, except for the methods of treatment and in some respects the materials which go into its manufacture. The 200" disc is a borosilicate glass of the general type of Pyrex, and would not ordinarily be considered an optical glass. It will be used as a reflector rather than a lens. The more usual types of optical glass may be borosilicate crowns, barium and similar products. Their fabrication involves melting in pots, very careful stirring of the glass to insure its satisfactory homogeneity and, finally, permitting the glass to cool and anneal within the pot. The pot is always destroyed in the production of such glass and, therefore, the process becomes more costly

than it might otherwise be. Also, in the breaking up of the pots the glass is broken up into chunks of various sizes which are carefully examined for their freedom from included bubbles and similar defects, and for the production of special lenses which can be fabricated from a given chunk. Some high powered microscope lenses are so tiny that they are ground by being set in the tip of a steel holder and then ground and polished by hand with extreme care. The composition of the glass is very carefully controlled to get certain specific properties of index of refraction, dispersion, expansion and so forth.

Tempered Plate Glass, which we call Herculite, is approximately four times stronger than the original Plate Glass from which it is fabricated and will withstand temperatures around 650 degrees Fahrenheit. When broken, it breaks up into small cubical fragments which tend to fly in the plane of the glass, if at all, but will also tend to bind

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Summary of N.A.P.A. Contest Papers

STUART F. HEINRITZ

Editor, PURCHASING

A TOTAL of thirty-seven contest papers, describing typical organization and routine of proved adequacy for the companies represented, indicate fairly conclusively that essentially the mechanics of purchase procedure follow along pretty generally standardized lines.

A need is expressed, either from stores or production, in the form of a requisition to the purchasing department. After due investigation, assisted by adequate departmental records and information files, this is translated into a purchase order which specifies the terms of the transaction. The goods are delivered, perhaps after a follow-up, and the satisfactory nature of the delivery is noted through receiving and inspection reports, and on the strength of this receipt, the vendor's invoice is certified for payment.

That is the simple story, followed in practically every case.

In following through the normal routine of the buying operation, it is obvious that the same bill of materials, and pertinent data regarding terms, etc., appears on at least three basic records—requisition, purchase order, and receiving report, besides being recorded again on the invoice issued by the vendor. In addition to this, it may require authorization by some managing official, it reappears on requests for quotation and tabulation of bids, an acknowledgment from the vendor is necessary, the using department must be informed that the order has been placed, some one must have the details for systematic follow-up (whether this be done by the using department, as advocated in the third prize paper, or in the purchasing

department), and the same information is also necessary for various checking operations along the line. Since the majority of orders call for items that are standard and recurrent in the company's operations, there is a further element of repetition in such replacements or reorders, on which the particulars have previously been assembled and recorded.

It follows, then, that one of the important means of achieving efficiency is to avoid as much as possible of this potential duplication of effort and research and of actual clerical work—to make past experience instantly and completely available, and to make each entry do the greatest possible share of the complete job, to save time and repetition by having sufficient copies traveling along more or less parallel lines toward the ultimate goal of consummating the purchase.

Starting with the requisition, we find that two or three copies are generally sufficient. One for the purchasing department, and one for the using department's file are essential. A third copy is involved when branch stores or plants come into the picture, or when it is required to check in the budget or cost or accounting department against a certain appropriation. The third copy is also used as a time saver by sending one direct to the purchasing department and one to the authorizing official. This enables the buyer to get to work at once on preliminary detail pending the receipt of the management's certification.

Other time saving suggestions include sending the purchasing department an advance copy of the bill of materials on a special project, or a copy of the request for appropriation in public buying. One paper mentions the use of a teletype in making out the requisition, which also gives the buyer advance notice, but must be confirmed by the written requisition.

It is desirable to have the requisition as complete as possible, as to when and where wanted, and designating the material either by specification or by stock number. Several of the forms submitted are arranged so that the purchasing office copy also serves as the work sheet for tabulation of bids. Two papers advocate a combined requisition-order form, in which terms and vendor's name are simply inserted by the purchasing department instead of making out a separate document. That works on some types of materials, but not on all.

Being thus apprised of the need, the purchaser must determine what, when, where, how much, and at what price to buy. To this end, he maintains a record of past transactions and past consumption, source of supply information, catalogs, correspondence, and the like. In the words of one contestant: "The primary requirement of an efficient purchasing department is an abundance of information. Hence the essential organizing of an efficient purchasing department is largely the organizing and cataloging of the various sources of information."

The purchase order is probably the most important of the forms. In the systems described, eight companies use three copies, nine use four copies, five use five copies, two use six copies, three use seven copies, and there is one case each of an eight-part and nine-part purchase order form. The prize paper recommends six copies, each serving a specific purpose—one to the vendor, the purchase file, stores or receiving department, using department, accounting, and traffic.

On the whole, the trend seems to be toward the use of fewer copies and making each copy do more work. The receiving department copy, for example, (usually made without inserting the price data) frequently serves as the receiving and inspection record, and the vendor's copy frequently includes a detachable coupon for use as an acknowledgement. Ten years ago, I am sure that the average number of copies would have been substantially higher than four. Such simplification is desirable if it can be achieved without denying the essential information to anyone in the organization who has occasion to use it.

In some of the newer multiple forms developed for this sort of work, all copies are necessarily printed on the same stock. But many of the systems make effective use of various colors to identify the duplicate, triplicate, quadruplicate, etc., providing a quick and sure index to the proper routing of the copies. One other interesting use of color for signalling is noted by one writer. In certifying an invoice for payment, a gummed sticker is attached before sending it to the accounting department. These labels are printed in red and in black, with identical wording, but the red indicates at once that a cash discount can be earned by prompt payment.

Another feature which impressed me in going over the various forms submitted, was the general use of full sized sheets—the $8\frac{1}{2} \times 11$ letter size for requisitions and orders, and most of the card files in 5×8 rather than the smaller sizes. The utility value of plenty of work-

ing space on the forms has apparently outweighed the initial economy of the smaller sheets which was formerly recommended.

Invoices are generally requested in duplicate to facilitate checking against the purchase record. Two companies ask for triplicate invoices, and one requires seven copies on special invoices covering returnable reels or containers. Only one, a municipal buyer, furnishes his own invoice forms to the vendor, these also being in triplicate.

So much for routine. Now for the matter of departmental organization. This varies widely, depending on the size and general organization plan of the company. One thing that impressed me was the fact that, except for purely clerical operations and the conduct of stores divisions, responsibility for the whole purchase function—from policy, through research and negotiation, down to the signature on the order—is almost universally centralized in the single person of the purchasing agent. When size of the company dictates expansion of the purchasing division, the usual procedure is to departmentalize by commodity groups, with the divisional purchasing agent, assistant purchasing agent, or buyer exercising a similarly centralized responsibility within his specific group.

It seems to me that this is significant. It certainly points to the purchasing man as a key executive in the organization. At the same time it raises a question as to whether overall efficiency might not be promoted by a greater use of staff specialists on various phases of the work, reporting to the purchasing director. Possibly one reason for restricted scope of the purchasing department—the recurring controversy regarding control of stores, inventory, traffic, and other functions closely related to purchasing—is the physical limitation inherent in such extreme centralization. Is it true, as one of the papers states, that "Accumulation of data of value cannot be delegated to an assistant?"

One of the papers does provide for staff assistance; one assigns to the

assistant purchasing agent the duty of liaison with other departments; three are organized for supervision of tests on new materials.

Only one paper definitely suggests that storeskeeping is a separate function. Eight specifically include it as a part of purchasing, and most of the others do so by inference. Two insist that inventory control must also come under the purchasing agent's supervision, while one maintains a duplicate inventory record in cost and stock departments but none in the purchasing department.

As to the determination of whether departmental operation is really efficient, the third prize paper offers a rough check, contending that the time is ripe for analysis and review whenever the cost of purchasing rises above 2% of the dollar value of purchases; when the cost of storeskeeping rises above 5% of average inventory; when the cost of salvage is greater than 40% of replacement cost; or when the cost of selling surplus and salvaged materials rises above 12%.

In summary, the following quotation from one of the papers contains much common sense and food for thought: "The problem a purchasing agent faces is to determine (a) what operations are essential, (b) what operations in addition to the essential ones are likely to pay for themselves, and (c) what operations are desirable adjuncts in proportion to their cost."

Finally, lest we be drawn into the error of supposing that purchasing efficiency is a matter of maintaining an expansive catalog file and following routine from the viewpoint of a precise office manager, I will add one more quotation: "It will not impair the dignity of any purchasing agent to be practical. Go out in the shop—see for yourself what is wanted. Know what you are buying from your own experience. Remember a catalog version is quite plain only if you carry in your mind the vision of the article you want. . . . The buyer of any organization is 100% more successful if he has had actual experience in his own line of business."

The Container Board Outlook

THE CONTAINER INDUSTRY today is probably the finest barometer of consumers goods in the country. In the paper industry we have always been able to prove that consumption of all papers followed very closely the population and literacy curves of a country. We try to judge the consumption of containers by three factors: (1) the growth of population, (2) the increase in standard of living, and (3) the substitution of paperboard containers for others which may have been used prior to such introduction. This substitution, although the least important of the three factors, is continually going on in every industry. As a result, we have an industry which should have few fluctuations in volume and price over the long pull. There should be a steady increase in consumption except for seasonal variations interrupted only by depression periods in which the standard of living of the population is necessarily reduced, and fewer goods are consumed by the ultimate buyer.

These basic economic factors proved themselves out in the late depression. The tonnage of container boards used in the container industry dropped only about 20% from the high volume of 1929. Compare this with the steel industry which, during the depth of the depression, was operating below 20% of capacity. This shows how much greater is the fluctuation in the take of capital goods as compared with consumers goods. Yet prices in the steel industry dropped about 25% and the drop in price of containers and container boards overall was around 50%. At the depth of the depression, we have record of few mills manufacturing container boards in the black after depreciation. There were two factors creating this disproportionate price drop. One, of course, was the fact that both the board and container industry is in many units, none of which have a very large proportion of the total productive capacity. Further-

more, a tremendous new productive capacity came into the field at a time of economic depression. The result was a buyers' Paradise and a sellers' Hades.

Today the situation is somewhat the reverse. Consumption has caught up and passed productive capacity. Years of operation at a loss made it impossible for the producer of boards to get financing for the construction of new capacity to take care of demand. Any board manufacturer up to 1936 who dared approach bankers with the statement that the demand for customers was increasing with the inevitable need for more capacity comparable with a demand for power or public utilities, never had a chance even to tell his story. As has always been the case, the foresighted manufacturer was stymied in being unable to get funds until the trend turned. Today there is a tremendous need of producing facilities. The demand for containers has increased during the first quarter of this year by more than 30% over the same period a year ago. Every machine capable of manufacturing container boards has been put on the line, many of them so antiquated as not to be able to make money even at current prices. The manufacturer is today not asking whether the additional productive capacity will bring him in a return, but simply whether he can supply his container customers without a cash loss and thus hold either his container fabricating customers, or in the case of integrated mills, his container consumers. In the meantime a considerable amount of productive capacity some of which should have been in operation as early as last fall has been held back and will go into the picture

next fall. There is ample box-making capacity available. The supply of board is the bottleneck. Beginning with the middle of last year, before the tide started, and assuming the normal average growth, averaged over the last 10 years including depression years, the new production in container boards coming into the field will barely take care of the regular demand we anticipate in 1940. Furthermore, there has been a constant increase in demand for box boards which are produced in the North and where there has been no increase in new capacity. Northern machines now manufacturing container liners will have to be put over on to box board to take care of the situation there.

Roughly, therefore, we can put the picture in this way. Unless there is a general depression prior to 1940, the new capacity coming in will about balance off the normal growth in demand. The size of board machines makes it difficult to take care of increasing demand exactly as it steps up. There are liable to be periods in which new production outstrips demand. Were the situation the same as at the time of the last depression, this might result in wide price fluctuations. Certain other factors, however, have come into the picture. A large proportion of the uneconomic marginal machines are now in the hands of the larger factors who obviously desire to utilize their low cost equipment and will not continue operating antiquated machines any longer than they have to. Furthermore, as soon as the demand becomes less, the buyer will refuse to accept a product manufactured by these machines on

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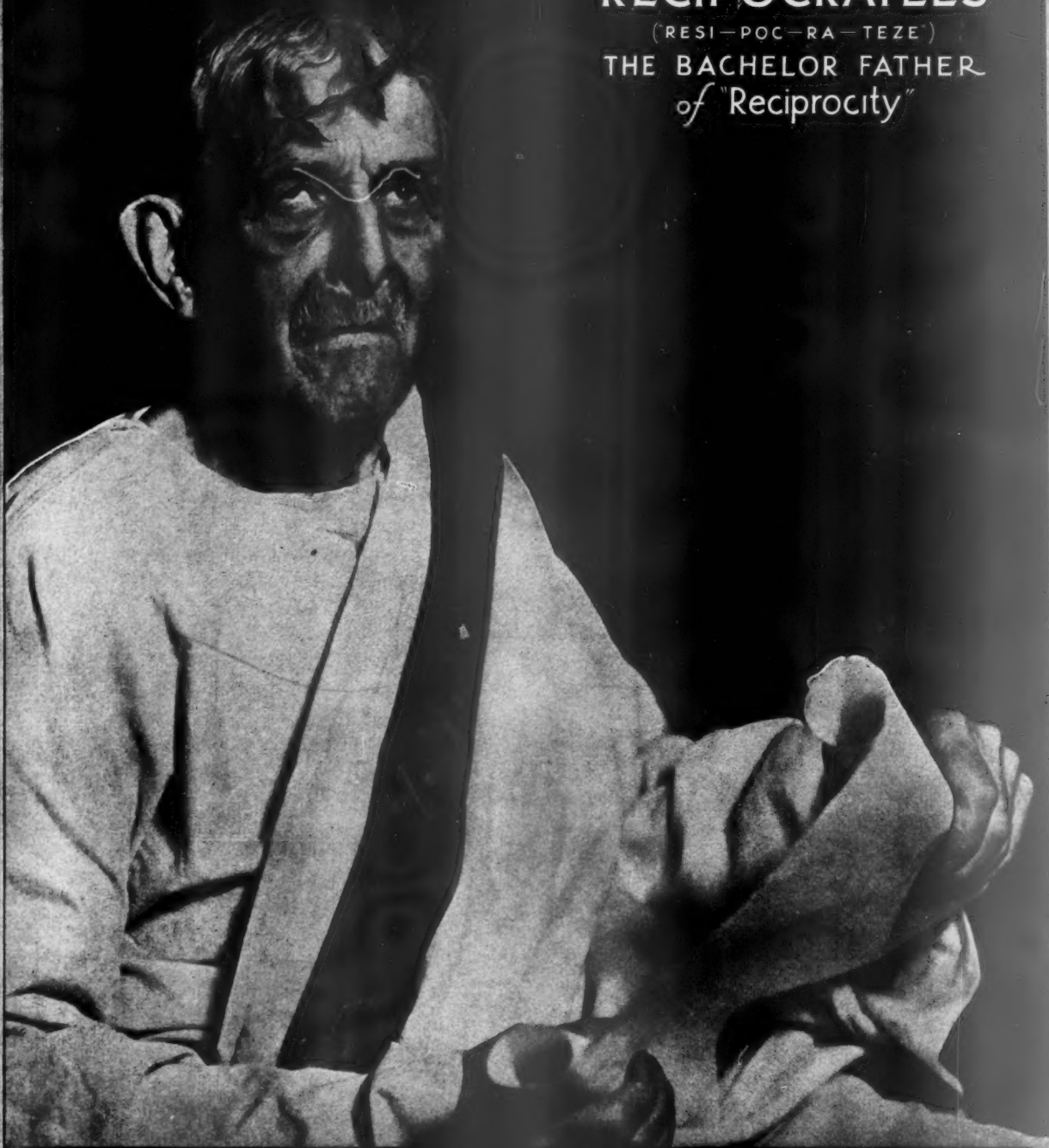
ALAN G. GOLDSMITH

Mead Corporation
New York

RECIPOCRATEES

(RESI-POC-RA-TEZE)

THE BACHELOR FATHER
of "Reciprocity"



Wreathed in poison ivy sits the Perverse Progenitor of a Thousand Evils.
He would prostitute the Purchasing Agent, degrade the Salesman, ignore the Engineer.
He swaps the equities of Stockholders without their Knowledge or Consent.
The Doctrine of Reciprocity was plagiarized from the Chinese, originators of the twin backscratchers.
Carried to its ultimate conclusion we would be taking in each other's washing.
American Industry was built by Science, Initiative, Merit and Competition—still a good formula.
Eject the rotten apples from the basket—before our business ethics fall to the level of politics.

W. C. C. C.

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The Copper Industry

ALBERT E. PETERMANN

Vice-President

**Calumet and Hecla Consolidated Copper Company,
New York**

COPPER PRODUCTION is a world industry, and in a free market every pound of copper produced is sold in direct competition with every other pound of copper, no matter where produced or where marketed. For many years American producers dominated the world industry and the American price fixed the price in the world markets, because the United States led the world in copper production and was called upon to produce a large amount of copper in excess of its own needs. Previous to the World War, this excess approximated 200,000 tons annually, which was the tonnage necessary to meet the demands of foreign consumptions over and above foreign capacity to produce.

During the decade following the World War, however, a revolutionary change took place in the world copper industry. This change occurred outside of the United States, particularly in Africa and Canada, where new copper deposits of tremendous tonnage and exceptionally high grade were being developed and equipped for production. The new foreign production began to reach the market in quantity in 1929, and by 1930, the long-time direction of flow of copper in international trade had been reversed and, instead of American producers supplying the foreign market, foreign producers began to supply our domestic market, and London quotations were setting the price for the metal not alone abroad but in our domestic market.

The United States, which formerly enjoyed a large export business in copper, was a *net importer* in 1930, 1931 and 1932. During this period, the selling price of copper suffered a consistent decline, reaching the all-time low of about 5 cents per pound by the end of 1932. The falling off of consumption in the United States, the loss of the foreign

market, and the importation of foreign copper resulted in the building up of stocks of copper in the hands of American producers to an all-time peak of almost 600,000 tons by the middle of 1932. It was these conditions which brought about the enactment of the import tax on copper which went into effect in June, 1932. Regardless of personal opinions with respect to tariff policies, it must be admitted that the import tax exercised a stabilizing influence on the whole world industry.

The flow of foreign copper into the United States ceased, and the tonnage of stocks in the hands of the producers began to decrease. Liquidation of these stocks, which was an imperative necessity, continued until at the end of 1936 the tonnage was about normal. During this period also, the selling price of the metal improved rather consistently, with some recessions and some upward thrusts, until it again reached the neighborhood of the average selling price of pre-depression years.

Abroad, with the incentive of competition for the American market removed, foreign production was brought into step with foreign consumption, to a reasonable degree, by a production agreement which remained in effect until January, 1937.

The production of secondary copper, in the past, has been handled almost entirely by Custom Smelters and Refiners who themselves have no direct interest in mining operations. As copper is practically indestructible, the position of secondary copper has assumed greater and greater importance in the industry and probably supplies on an average

about 20 per cent of total consumption. However, under certain conditions, secondary production exerts a controlling influence upon the market price of copper.

Material going into Custom Smelters and Refineries for processing is handled in various ways, but by far the greater part of the secondary material or scrap treated by Custom Smelters is bought outright. This is commonly referred to as "Custom Intake."

Assuming that the Custom Smelter is interested only in collecting his proper charge for processing, it follows that where he has bought the material outright he must be able to sell the resulting metal at a price no lower than the purchase price in order to avoid loss. For this reason, the practice obtains quite generally of hedging or selling concurrently an amount of copper equivalent to the intake, and, in periods of stagnant copper buying, the Custom Smelter, under pressure of the necessity of moving his current intake, is often forced to cut the selling price of copper to whatever level will effect a sale. Furthermore, the scrap dealer naturally tries to ship his accumulated material to the Custom plants at such price periods as he thinks will give him the greatest amount of profit. Consequently, when the copper market indicates an upward trend in price, the scrap dealer withholds shipments for the higher price. On the other hand, when the market begins to look weak, scrap is delivered to Custom plants in large quantities. In this way the scrap factor accentuates strongly the fluctuations in the selling price of copper

and the material itself flows to the Custom plants in surges.

Primary copper production is not as flexible as is the production of most commodities. A copper mine, closed down for an extended period, cannot be reopened and put into production overnight. When mine production actually starts, it usually is 60 to 90 days before the refined product is available for the market. On the other hand, when production is once under way, it becomes economically difficult to bring about drastic curtailment.

"Copper Consumption" is a term which has lent itself to various confusing interpretations. In the copper industry, actual consumption is widely different from "demand," "sales," or "deliveries," because the latter terms are affected and distorted by such factors as buying for future consumption and speculation. "Demand," "sales" and "deliveries" are subject to comparatively sudden fluctuations. Actual consumption is the tonnage which has gone into fabrication and is no longer available in the form of unfabricated refined copper. Actual consumption moves up and down in fairly long tangents.

Inasmuch as secondary copper represents in reality unconsumed copper which inevitably comes back into the market at some time, the function of primary or new copper production is limited to filling the gap between secondary production and consumption. Therefore, the existence of an adequate supply of copper in the United States can be fairly determined and gauged by matching actual consumption of new copper for domestic use against domestic production of new copper.

American producers have entered upon a program of full production for 1937. By the middle of the year, the mines should be operating at near capacity, and it is estimated that new copper production this year will exceed 900,000 tons.

The United States consumption of new copper in 1936 was somewhat less than 650,000 tons. From the present outlook, the present rate of production will provide an adequate supply for legitimate consumptive

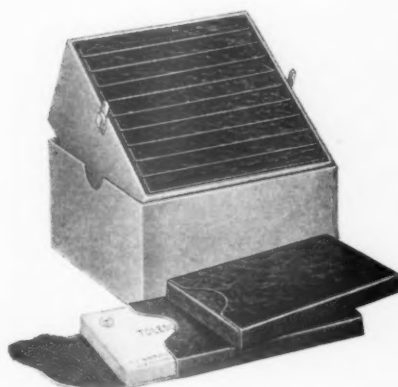
needs and, if maintained, will probably result in the building up of surplus stocks.

For the 31 year period, 1900 to 1930 inclusive, the average selling price of copper was approximately 15.9 cents per pound. Even excluding the war period, the average was 14.9 cents. In January and February of 1933, the price reached an all-time low of 4.775 cents per pound. From that low point the selling price showed a fairly slow and consistent improvement up to the closing months of 1936. The end of 1936, and the early months of 1937, saw the development of a highly speculative foreign market based upon the

apparent imminence of a general war. The demand for copper abroad was greatly stimulated by other factors than actual consumption. It is true that foreign consumption had reached a healthy level, but, in addition to that, copper was bought in large quantities, not for actual present use, but to build up reserves for war purposes, as a hedge against inflation and, most of all, for pure speculation.

Without attempting to predict the future trend of copper prices, two factors may be mentioned which, under normal consumptive conditions, should exert a steadying

Continued on page 71



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JUNE 1937

F. O. B.

(Filosofy of Buying)

Convention Jottings

Everything ran smoothly except the William Penn elevators.

A good many of the golfers took a plant inspection trip to the Pittsburgh Field Club, to watch the P.G.A. boys in action on the greens and fairways. But the inspiration of a good example was not generally reflected in the N.A.P.A. score cards.

There's as much exercise in going through a strip mill as on a golf course.

No, Capt. O'Hay was not hired on an hourly wage basis; he merely believes in giving good measure. And by the way, the lecture was continued in Parlor E until about 4 A. M.

Gen. Ike Walton engineered a major troop movement with distinguished success when he maneuvered the two overflow banquet meetings into the main ball room for the speaking program—and all by remote control.

The Executive Committee proved that they could "take it" by being on the job at 7:45 every morning.

The retiring officers made an unscheduled appearance at Bill MacMillen's Iron & Steel dinner, arrayed in convict uniforms as part of their Hendricks Club initiation. And just when most of them felt that they were being released from doing their stretch.

It was field day for the youngsters at the Idlewild Jamboree. And the buyers got a bigger kick from watching the kids at the concessions than from going through the stunts themselves.

One of the solid accomplishments reported at the convention, though receiving less publicity than some of the others, was the simplification of oil field casing sizes, promoted by the Oil Company Buyers Group.

A word of special commendation for the presiding officers at the various convention sessions. They did the job in excellent fashion, and kept a full program running on schedule time.

It was a long way from the meeting rooms on the 17th floor to the Informashow in the Chatterbox and sub-cellar, but both terminals, as well as the numerous way stations, were well patronized.

P.A.'s. Mother Goose

Purchaser, Purchaser,
Where have you been?

*I've been conventioning
At Pittsburgh, Penn.*

Purchaser, Purchaser,
What did you see?

*Steel mills all humming
With activity.*

Purchaser, Purchaser,
When did you go?

*Luckily, just a week
Before C.I.O.*

IT WAS TO BE expected, of course, that the national convention schedule would disarrange some of the plans of the local associations. Nevertheless, we are intrigued by the announcement of the Connecticut Association: "May Meeting—Tuesday, June 1" and that of the Rochester Association: "May Meeting—Wednesday, June 2."

Statistically minded students of purchasing may be interested in the following data on the Pennsylvania Railroad's buying, credited to General Purchasing Agent C. E. Walsh in a recent issue of *Mutual Magazine* and reported by the *New York Times*. Coal bought during 1936, if loaded on a single train of 50-ton cars, would extend from New York City to Silver Creek, Neb., a distance of 1,495 miles. The smallest printed form is a little ballot slip for freight handling. Annual consumption of these forms, laid end to end along the rails, would extend 1,349 miles (terminal station not specified). The amount of total purchases for the year is figured at the rate of \$664 each working minute. Check these statistics with your own record.

IT DOES NOT necessarily follow that because some one wants to sit down on the job, some one else is obliged to lie down and take it.

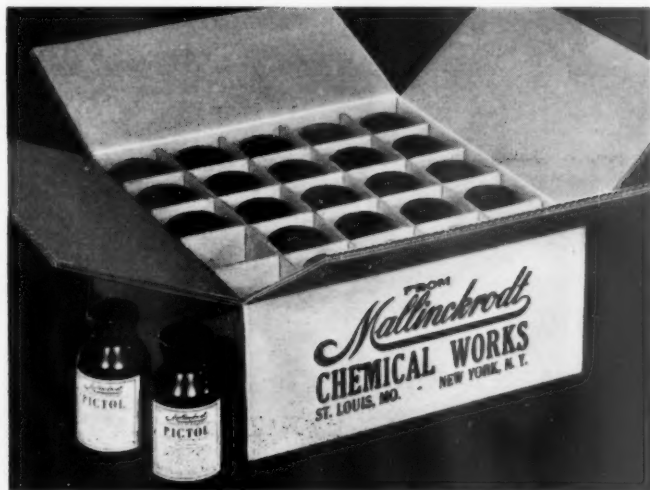
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provide utmost protection at minimum cost. • Call or write our nearest office for sample box and pertinent facts covering your individual needs.



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Aluminum

S. K. COLBY

Vice President
Aluminum Company of America

ALUMINA IS THE principal raw material in the production of metallic aluminum. About two pounds of bauxite is required to make one pound of alumina, and about two pounds of alumina is consumed in the production of one pound of aluminum. Other important raw materials essential in the production of aluminum include cryolite, coke, tar and electricity.

In view of the fact that it requires enough electricity to keep a 40-watt light burning constantly day and night for more than a week and a half to make one pound of aluminum, the reduction works are always situated near the source of large blocks of electric power.

The process by which alumina is broken down into its component parts of aluminum and oxygen is electrolytic in nature. In the operation of the electrolytic cell in which this operation takes place, cryolite, a sodium aluminum fluoride mineral from Greenland, or synthetic cryolite made in the United States is first introduced into the cell and fused when the current is applied. The alumina is then stirred into the molten cryolite and allowed to dissolve. As the current continues to pass, the aluminum in the alumina drops to the bottom of the cell, while the oxygen combines with the carbon of the anodes and burns to carbon dioxide. The operation is somewhat analogous to electroplating, in that the aluminum in molten form is deposited on the cathode lining of the cell. The bath material of cryolite is little affected during the reaction, and to keep the process continuous it is only necessary to add more alumina from time to time.

Unlike the blast furnaces of the steel industry, the cells in which alu-

minum is produced are comparatively small, each cell yielding about 200 lb. of aluminum every other day. The metal from a number of cells is tapped into large mixing ladles from which it is cast into pigs. The pigs contain some dross and electrolyte. As a result, they must be remelted to free the metal of non-metallic impurities.

Commercially pure aluminum has a tensile strength in cast form of about 8,000 lb. per sq. in., and in wrought form of about 13,000 lb. per sq. in.; but by rolling or by other cold working processes, its strength may be doubled. By alloying the metal with other metals, together with the use of heat-treating processes, the tensile strength of the wrought materials may be raised to as high as 65,000 lb. per sq. in., or in other words, to within the strength range of structural steel. The principal alloying elements are copper, silicon, magnesium, manganese, zinc and nickel.

While ingot is the bulk form in which aluminum and the aluminum alloys are sold, both the commercially pure metal and the aluminum alloys may be fabricated into a wide range of basic commodities. Sand castings, permanent-mold castings, and die castings are regularly produced in the aluminum alloys while the ductility and malleability of aluminum and many of the aluminum alloys make them particularly adaptable to such metal-working processes as rolling, forging, extruding, drawing and spinning. Plate, sheet and foil, bar, rod and wire, tubing, and molding are manufactured in both aluminum and its alloys, although foil generally is rolled from the pure metal. Structural shapes, either rolled or extruded, and forgings, usually are made

in the strong aluminum alloys, since strength is a requisite for the purpose for which they are intended.

The ingot aluminum employed in the United States in the manufacture of the basic commodities, may be obtained from three sources of supply; the domestic producer of primary aluminum (Aluminum Company of America); foreign producers of primary aluminum; and domestic dealers in secondary aluminum. While we mostly use ingot aluminum of our own manufacture in our own fabricating plants, our domestic ingot shipments, according to Federal and other statistics, show that we sell the hundreds of manufacturers of aluminum products only about one-third of their requirements in aluminum ingot, their purchases from the secondary and foreign producers accounting for the major portion of their supply.

Nature gave aluminum a protective oxide coating, but nature's coating of oxide, while sufficient to retain the strength characteristics of the metal over a period of time, is not sufficient to maintain the metal's pleasing appearance. Research has improved upon the work nature had already done by developing an oxide coating for aluminum many times thicker than that deposited by nature, in order to produce a product having a hard surface which is highly resistant not only to corrosion but to abrasion as well.

The anodic (alumilite) process is employed in treating aluminum for many different types and conditions of application, the most notable one being its use for store fronts and entrance details. A store front and entrance constructed of aluminum treated by the Alumilite process can be readily maintained with the use of only soap and water. In other words, there are practically no corrosion products, and the soap and water are employed merely to wash off foreign material which may have settled on the metal.

During the experimental stage in the development of the Alumilite process, it was discovered that the oxide coating deposited on the metal could be impregnated with dyes and

Continued on page 60

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Price Trend Summary

ECONOMIC EVIDENCE presented at this Convention has clearly indicated that the business outlook involves two specific angles. First, the stage appears to be set for a summer recession—a natural development in view of a prolonged period of forward buying, the broad advance in commodity prices, a change in speculative sentiment, the apparent successful bridging of a strike crisis, a temporary lull in inflationary fear, weakness in the stock market, an increase in inventories of finished goods, and finally, seasonal characteristics.

The second angle involves the long-term prospect, and it is generally believed that fundamentally business is in the early stages of a new era above normal and the next major decline will not materialize for several years. The known facts clearly show that the physical volume of production is not exorbitant, nor has this country experienced a prolonged period of extensive output. The reservoir of replacement demand is still well filled. Inventories of basic raw materials are substantially under the average of recent years. Employment and purchasing power, both industrial and agricultural, have increased in a manner that is conducive to sustained business progress. The cost of living is not out of alignment with the ability to buy. Briefly, the long-range outlook remains favorable. Today commodity prices based on raw materials exclusively stand 95% above the low ebb of 1933 and 5% under the average for 1929. The peak, however, was reached in April and since that time the trend has moved moderately downward.

The high spots in leading commodity groups from the standpoint of economic and price developments are briefly as follows:

Aluminum

This commodity holds the distinction of being one of the most stable of all non-

ferrous metals. Although prices have not bounded upward commensurate with other non-ferrous metals, production has responded to expanding demand. The highest level of production ever reached was 229,037,000 pounds in 1930. In 1934 production was only 74,176,500 pounds. There was a healthy increase to 119,295,000 in 1935, followed by an 89% increase to 224,929,000 pounds last year.

Production will be further stimulated in 1937 reaching an all-time peak. The ability to hold prices stable is a powerful factor in encouraging expanding consumption. Recent price irregularity in non-ferrous metals, climaxed by a sharp decline following an advance that was economically unhealthy, is not an indication of any weakness in the price level of aluminum.

Copper

Prices were as low as 5¢ a pound in late 1932. The ten-year average prior to 1929 was 14.73¢. The economic position of this commodity has changed extensively over a period of years. This is perhaps best illustrated by noting that in the year of record world production, 1929, the United States produced 56% of the total. During the low ebb of the depression, the United States produced 26% of the world output in the year 1932. Production has expanded by leaps and bounds, accompanying economic revival with the greatest proportionate increase being noted in South America and Africa. Rising prices and diminishing stocks have resulted in the abandonment of the World Copper Production Control Plan. The principal point to keep in mind is that the world producing capacity is not limited. Competition between the principal producing countries will increase even though the tax of 4½¢ is extended. Expanding output of primary and secondary copper, the prospective summer recession in industrial activity, coupled with a lack of price stability abroad work against an early return of advancing price trends.

Lead

The rapid decline in world stocks has caused considerable apprehension, but fundamentally there is nothing critical in the situation. Domestic output has lagged considerably and last year was 31% under the five-year average prior to 1930. This does not alter the fact that total producing capacity available is far in excess of indicated consumption. Furthermore, stocks, which have declined with practically no interruption during the past twelve months, remain far above the pre-depression complement.

Looking ahead, the volume of production will soon equal and then exceed consumption, and by the third-quarter period stocks will be less susceptible to a declining trend. Prices climbed rapidly during the final quarter of 1936 and the first quarter

of 1937. Lead has recently stabilized at the 6-cent level, representing a drop of 1½¢ from the March peak. Any subsequent price change during the near-term months should be confined to narrow limits.

Zinc

The ten-year average price for zinc prior to 1929 was 6.95¢. The lowest price reached during the depression was 2.67 in May, 1932. Price stability characterized the period beginning with the second quarter of 1933 into the fourth quarter of 1936. A peak of 7.85¢ was reached in March and April followed by a reaction to a current quotation of 7.10¢. Two countries dominate production, the United States and Belgium. Production outside the United States has increased sharply in recent years.

Stocks in this country are now the lowest for any month since December, 1925, yet there is no cause for alarm as the underlying trend of production throughout the world is upward. International competition is keen, and zinc prices in this country cannot economically register independent strength without causing imports to increase. Increased producing costs and the relatively strong statistical position are bound to act as a cushion under the price decline, but as matters now stand, there is no clear indication that adverse influences are fully discounted.

Tin

Tin is operating on a control plan under the jurisdiction of the International Tin Restrictions Scheme which was formed in April, 1931. World production in 1936 totalled 177,879 tons as against only 90,680 three years earlier. Periodically, particularly during times of industrial activity, statements appear to the effect that a world shortage of tin is impending. Undoubtedly the grades of ore will tend to become less rich, but technical developments in mining offset the leaner ores. Production quotas have been stepped up—now a full 100% of the base—and world output is headed toward a new record. The downward underlying trend of world stocks promises to be checked within the near-term period. Imports have been well maintained, and invisible supplies are comparatively heavy, reflecting the policy of forward buying so pronounced a few months ago. There is no danger of a price collapse in tin, but price stability will be difficult to maintain.

Steel

Steel prices are today the highest for any period since early 1924. One important phase of the situation has been clarified. Prices have been announced for the third quarter showing no basic change from the quotations now in effect. Ordinarily prices for the new quarter are not announced until a few days before the begin-

ning of the period, and this unusual action has been taken to maintain confidence and prevent another wave of forward buying, which would materialize if higher prices were contemplated.

The backlog of unfilled orders is sufficiently heavy to assure a well-maintained rate of production provided labor controversies do not spread. Price stability is in prospect during the balance of the year.

Coal

Production has forged ahead at a pace far in excess of consumption, and stocks of coal above ground are now estimated 22,855,000 tons above a year earlier. If it were not for artificial forces in the situation, prices would be subject to considerable weakness. However, the Guffey Bill, which now dominates the industry contains some very interesting features. The Bill holds to June 16, 1933 as the date for deciding the validity of contracts. Unfair methods of competition set forth in the bill are almost identical to those which prevailed in the first Guffey Bill introduced two years ago. There is also the minimum price feature. It is difficult to conceive of any economic or statistical forces that are now in evidence which would justify independent price strength. It is primarily a question of marking time, watching new developments, and particularly the practicability of the new set-up.

Petroleum

It is estimated that the known reserves of petroleum are approximately 12,500,000,000 barrels, equal to eleven years' supply. The situation is not anywhere near as critical as those figures suggest, but it is true that natural resources are rapidly being exploited, and yet this phase has not resulted in any phenomenal development in the price structure.

Actual production in 1936 surpassed the previous peak recorded in 1929. During the first four months of this year output has registered a further expansion and yet this volume in the form of derivatives has rapidly entered consuming channels. Stocks of crude oil are today the smallest in fifteen years, which simply means that reserve supplies are limited because of the phenomenal growth in consumption.

The price increase that has taken place since the low of 1936 reflects increased producing costs as well as the strengthening in the supply-to-demand ratio. Current record-breaking production naturally prevents prices from registering independent strength, but from a long-range standpoint the underlying trend appears definitely upward.

Lumber

The combination of aggressive forward buying, higher level of producing costs, including labor and taxation, a material strengthening in the supply-to-demand ratio, an unusually heavy volume of unfilled orders, and the usual degree of speculation that accompanies rising prices, has established lumber prices on a plane that appears too high to be economically healthy. There is no danger of a shortage. Production has responded to climbing prices and has attracted the marginal producer. High prices for building materials will hold the total volume of new construction for 1937 40% under the five-year average prior to 1929. Latest data show that gross stocks of lumber at the mills are comparable with a year ago. Production is now catching up with orders received and shipments, and the underlying trend of unfilled orders is now downward.

A projection of present trends indicates that third-quarter stocks will be increasing. The present price list of both softwoods and hardwoods is sufficiently high to fully counteract bullish forces. As time goes on, bearish forces will gradually outweigh the strong elements, and therefore the price structure of lumber in general is in a vulnerable position.

Briefly summarizing price trends, there is specific evidence that a rest period or breathing spell is now in effect which from a long-range standpoint is extremely healthy. Now that production schedules are

on the verge of equaling the rate of consumption, and inventories are no longer susceptible to a broad decline, the element of competition will tend to prevent further price strength during the near term, and moderate weakness during the third quarter appears inevitable. The next period of price firmness and strength will not materialize until a new upward trend in business asserts itself, which is now indicated during late 1937.

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The consumption of crude oil produced in this country has now reached the astonishing figure of nearly three and one-half million barrels daily. We are producing this year a volume of crude equal to the total cumulative production of this country up to the year 1904. At the present rate of consumption we require annually all of the oil which the State of Pennsylvania has ever produced. The combined production of Gulf Coast Texas and Louisiana in their entire history is sufficient for only twelve months' demand. We consume each year eight or nine Spindletops—two or three Oklahoma Cities.

In spite of this expanding demand, the industry has been able to keep pace and to maintain a strong statistical position. The present known reserves carry the industry further into the future than at any other period of its history. Such stability has not been the result of chance, but rather is attributable to improved methods of prospecting and to advancement in the technique of production. These developments are largely due to the broad vision of the industry in its attitude toward the expansion of research activity in the applied sciences.

The growth of the refining industry is even more spectacular. The total production of gasoline for the year 1900 would last a little over an hour today. Consumption has increased by a factor of 5 since the boom days of 1918. Not only is the total volume demand becoming larger, but also the average consumption per car.

Marketing facilities have likewise experienced remarkable expansion. The transition from the curbside pump to the modern service station is only typical of the development in every phase of customer relationship. From the farmer in the isolated rural districts to the great manufacturing plant in the industrial centers, engineering service is the striking characterization of the business.

When one considers the involved structure of the industry from exploration and discovery of oil fields; production and transportation of crude by pipe line; refining; distribution and shipment of refined products

Dr. PAUL D. FOOTE

Executive Vice President

**Gulf Research and Development Corp.,
Harmarville, Pa.**

by tank ship, tank car, tank truck, pipe line; and finally marketing; is it not astonishing that gasoline may be delivered to your car at the cost of bottled drinking water, and lubricating oil at the cost of colored soda-pop?

Although the oil industry has shown such rapid progress there is at least one business the expansion of which has been even more outstanding. This is the business of extracting federal, state, county, and city taxes from the user and manufacturer of petroleum products. There are now 201 different methods for taxing the oil companies. For 1937 the total petroleum tax will amount to 1.3 billion dollars, numerically equivalent to this country's total crude oil production in barrels, and approximately equal to the dollar value of the product. The petroleum tax revenue is a substantial fraction of the entire federal budget. Before the days of the more abundant life, back in 1932 for example, our present tax was equivalent to 73% of the federal revenue, and in prewar days would have been sufficient in itself for a balanced budget.

During the time that the oil business has advanced from its early cookstove methods to its present status as a highly integrated chemical industry, a very important and directing influence has been constantly at work. This influence is research, the evidence for which is amply demonstrated by its accomplishments and by the large research institutions of the major petroleum companies employing several thousand scientists.

It is through research that new methods for discovering oil fields and new and more efficient refining processes are developed. These improved processes are required by the increasing demand. We are now producing twice as much gasoline from a barrel of crude as was possible a few years ago, and thereby are conserving a vast quantity of a non-replaceable mineral resource. Research is essential in order to lower manufacturing costs and also to offset taxation. A considerable portion of these decreased costs has been passed on to the consumer, as witness the decline in the price of gasoline since 1920. Exclusive of tax, present retail prices for gasoline are about half those of 17 years ago. The oil industry has always paid high wages, and with rising labor and commodity markets, it seems probable that the trend of petroleum prices over the next few years is upward from the recent

minimum. Research can not reverse this trend but through more efficient process development, the rate of rise will be moderated.

It requires the most extensive and intensive research to improve the quality of manufactured petroleum products. In the very highly competitive markets for petroleum, recognized superiority and quality are the driving forces impelling the major companies to develop their research activities. The demand for new and improved products by outside industries is ever pressing. The trend of industry in general is for higher operating speeds, greater horsepower per pound of engine, greater work per machine, higher temperatures to which lubricating oil is subjected, more severe performance requirements and longer operating life for all petroleum products. In fact this trend has been so powerful that in many cases performance demand has outstripped design, and lubricants are sought by equipment manufacturers and users which will permit an inadequate engineering device to operate successfully. Citation of specific examples would lead to argument, but fundamentally no lubricant should be expected to bridge the gap between the Roman chariot and the high speed railway car with its quite similar bearing structure. Furthermore, it requires something besides petroleum to push an aeronautical engine up to continuous and successful operation at 30% overload.

However these and countless similar instances made for progress in petroleum research. They are also in part responsible for the high rate of obsolescence in refining equipment. Old equipment is scrapped and new refining methods are developed, each process an evolution from the laboratory glass model, through the experimental pilot plant to the final commercial installation often costing several millions of dollars. One of the most recent practical developments is the manufacture of 100 octane number gasoline for airplane engines. In fact this material scarcely can be called gasoline since it is largely the chemical synthesis of a special hydrocarbon, whereas gasoline is a mixture of several hundred chemical compounds.

There are two entirely different systems of specification buying, which may be described as purchasing under design and performance specifications, respectively. The design specification is such as might be issued by the Government for the purchase of an artillery rifle. The complete design is formulated by military engineers and the manufacturer's sole duty is to make the parts and assemble to the dimensions specified, using materials having itemized physical properties. The manufacturer assumes no responsibility for the performance of the gun since he had nothing to do with the design.

The performance specification may be illustrated by the purchase of a steam turbine. The power plant management specifies the steam conditions under which the turbine must operate, the character of the load, the size and type of dry vacuum pumps, the guarantee for

Continued on page 57

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Coal Classification and Selection

HAROLD J. ROSE

Senior Industrial Fellow
Mellon Institute

Chairman, Technical Committee on
Coal Classification, A.S.A and A.S.T.M.



WHAT HAS BEEN accomplished with respect to coal classification? The latest issue of the A.S.T.M. Standards for Coal and Coke contains the tentative specifications for the classification of coals by rank and by grade. The classification by rank is summarized in a table in which coals are first grouped broadly into four great classes, namely, Anthracitic, Bituminous, Subbituminous and Lignitic Coals.

These classes are subdivided into from two to five groups each, having definite limits or boundary lines. The high-rank bituminous and anthracitic coals are differentiated according to their fixed carbon (or volatile matter) on the dry, mineral-matter free basis, while the lower-rank bituminous and the subbituminous and lignitic coals are classified according to the B.t.u. of the moist, mineral matter-free coal. Such terms as anthracite, semi-anthracite, and low, medium and high-volatile bituminous coals are accurately defined by these specifications. An agglomerating test is provided to determine proper classification at the boundary lines between the bituminous and adjacent classes, and a weathering test is sometimes necessary with coals which fall near the boundary line of the bituminous and subbituminous classes.

In devising a satisfactory classification according to rank, it was found necessary to calculate the coal analyses free from ash-forming mineral impurities. Of course, a classification by grade is also necessary, in which coals are arranged

in accordance with their condition as sold. The various items covered by grade classification are size designation, B.t.u. or calorific value, ash percentage, ash-softening temperature, and sulphur content, all based on the coal as sampled. The analyses range of the subdivisions is based partly upon commercial usage, and partly upon the tolerances which are appropriate with modern sampling and testing methods.

The soundness of the classifications seems to be indicated by the fact that during the three years since first publication, only one request for the reconsideration of a boundary line has been received from any commercial group, although the classifications affect the product of a billion dollar industry having more than 6,000 producing units in nearly 30 states.

While the classifications have been published only in tentative form for trial and criticism, up to the present time they have already found extensive use. They were at once put into use by the U. S. Bureau of Mines and the U. S. Geological Survey, and have been used regularly in connection with the purchase of coal by the United States Government. The classifications have also been used by state agencies and industrial groups in describing or specifying coals, and have proven helpful in connection with coal codes, and in local campaigns for the honest advertising of coal.

It now appears probable that within a few weeks' time they will have become full American Stand-

ards. It is most fortunate that after ten years of technical development work and probationary trial, this phase of coal classification is being completed just as the work of the new National Bituminous Coal Commission gets under way.

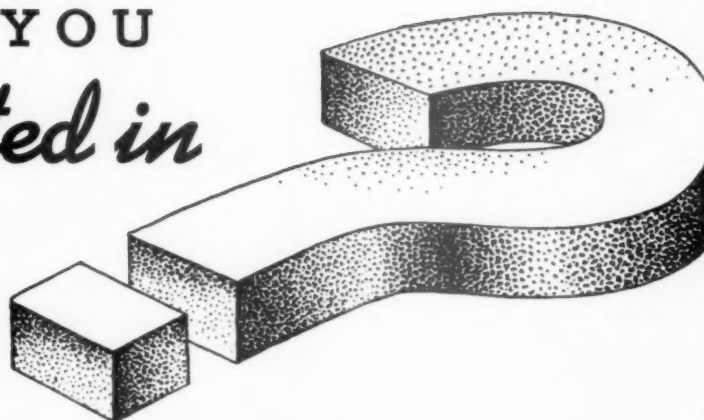
One phase of coal classification work which is still in progress is the preparation of definitions for varieties of coal such as splint and cannel coal. Scientific knowledge of such matters has not yet reached the point where agreement can be reached on exact specifications for such coal varieties. However, definitions for common banded coal, splint coal, cannel coal and boghead coal are being prepared, and these definitions should be commercially useful.

Use Classification

This technical work did not contain any direct information as to what characteristics were important in coal for specific uses and operating conditions. Accordingly, a subcommittee was formed with Mr. T. W. Harris, Jr., as Chairman, to study and report on practical coal selection factors.

A series of large blank tables was prepared, having 33 vertical columns devoted to chemical and physical coal-selection factors. The horizontal columns were devoted to all of the major uses of coal, subdivided according to types of equip-

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ment, and specific variations of combustion conditions or use. These blanks were sent out to a selected group of combustion engineers and fuel technologists with the request that they fill in the blanks of certain tables so as to indicate the average relative importance of each chemical and physical selection factor for the various conditions of use. The magnitude of this work can be realized from the fact that the opinions of various experts had to be averaged in obtaining each one of the more than 7,000 different entries in the final tables.

This ambitious undertaking was completed in 1936, and published by the N.A.P.A. It is unique and has attracted a large amount of favorable attention, since it presents in a very clear and compact form the average opinion of a number of fuel technologists.

No attempt was made in this report to give the reasons for each rating, nor in general to give numerical values or specifications for the various factors. The reason was that such matters were too complex to be handled in simple table form, and in many cases there are no accepted standards. Other steps are being taken to remedy this deficiency.

An Engineering Function

How should coals be selected so that your organization can get the most benefit from these heat units at the lowest possible cost? How can the Nation's two billion dollar coal bill be spent most wisely? Coal selection is a much more complex problem than coal classification, since it involves not only all of the chemical and physical characteristics of coal, but all of the peculiarities and operating problems of individual power plants or other coal-using equipment, as well as the vital elements of cost at the mines, freight rates and various marketing practices.

Much has been done, and still more will be accomplished within the next few years, in organizing our knowledge of how to select coals intelligently on the basis of specific engineering and market

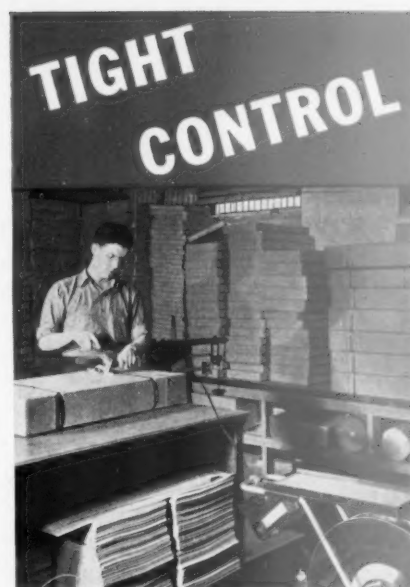
conditions. However, there is no indication that any short cut will be found which can eliminate the need for engineering skill and experience in coal evaluation. None of you can examine the previously mentioned report on coal-selection factors without finding that there is more to coal selection than you had realized before.

The answer lies in cooperation between purchasing agents and engineers. The combustion engineer or fuel engineer may be a member of your own organization, or he may be a consultant. He may be in the employ of a trade association, an equipment company or a company that is trying to sell you coal. It is not his business connection that matters so much as his ability to get results under the conditions peculiar to your own plant.

No generalized system for coal evaluation can ever replace the services of experienced engineers who are familiar with the fuels that are commercially available within your territory, who know how to get the best results from your existing plant, who can suggest worthwhile improvements and who are able to submit clearly written reports analyzing your local problems and making sound recommendations as to grades of coal which will best meet your own requirements.

Many companies have accomplished important savings by providing their operating engineers with instruments, and by encouraging them to apply known combustion principles, and by cooperating with combustion engineers who are authorized to make demonstration tests in the plant.

Coal companies are handling their selling and service problems in a new way, hiring technical graduates for sales and service work. Such men, supported by the excellent technical activities of anthracite and bituminous trade associations, and by fuel engineers connected with equipment companies, are now able to be of a great deal of service to the customer. Changes of this sort are coming very fast, and are of sound benefit to both the buyer and seller of coal.



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Where Do We Go from Here?

Dr. NEIL CAROTHERS

Director, College of Business Administration
Lehigh University

RECOVERY IS HERE, and here to stay. Recovery is here, finally, irresistibly, unstopably. It is not a complete recovery. There are still sore spots in the economic body. There is still an unhappy volume of unemployment. There are still enormous expenditures for relief. The government is still running a heavy deficit. Taxes are a heavy burden, and they are not going to be less very soon. The construction industry is not yet on its feet. Foreign trade still drags along like a wounded snake. Prices are rising more rapidly than production, and that is an unhappy condition. But the fundamental fact is that recovery is here, and it will not be stopped. Its course may be erratic. There may be temporary recessions and backslidings. Its course may be jumpy and uncertain. But the fact is that we are going up the hill and will continue to go up.

I know some very wise and informed men who believe that our recovery is in large measure artificial and unnatural. There may be factors of this kind, but they are not important factors. I know other wise and informed men who believe that we shall experience a violent and disastrous recession within a year or at most two years. I do not believe it. The forces of recovery are too powerful, too deep-seated, too wide-spread. This is not an American recovery, but a world recovery.

But there is a very serious question about this recovery. What kind of recovery is it going to be? Is it to be a natural, normal, wholesome recovery, with all the component facts of our economic order sharing in its steady progress, or is it to be a morbid, unnatural and feverish development? About the answer to that question I am not so sure. For there are many disturbing and dangerous conditions in our

present situation. They cannot stop our economic progress. They cannot reverse it and throw us back into depression. But they can make our progress unnatural, hectic, morbid and unhealthy.

You know what these dangerous and disturbing conditions are. You are interested in prices, and the possibility of inflation is one of the disturbing conditions now facing the country. The government still runs an enormous deficit, month after month, year after year. The banks are still gorged with government bonds. Despite the doubling of reserve requirements, there is still an enormous volume of excess credit. Worst of all, this country has no recognizable money system, no identifiable basis of credit and currency. The monetary policies of the government over the past four years have destroyed the gold standard, not only here, but all over the world. At present we hold more than half of all the monetary gold on earth. In addition to that we have some three billion dollars of worthless, dangerous and dishonored silver dollars. The whole bloated mass we are burying in Kentucky. Meanwhile we are nulling gold from all over the world, buying it with borrowed money and sterilizing it by putting it in a separate fund.

The materials of a disastrous inflation are here. It is merely a question whether they can be controlled. I still believe that it is possible to prevent a headlong, ruinous inflation. If the government would balance its budget and reduce its endless spending and arrange some sort of stabilization of currencies, we could still escape the deluge. While we can hope to es-

cape the worst features of inflation, I do not see how we can escape a very considerable rise of prices. We are going to have the old familiar phenomenon of a rising cost of living, with its disturbing effects on labor and industry and consumption. Purchasing agents may expect to pay increasing prices for commodities for a long time to come.

Disturbing conditions exist in the field of labor. Powerful labor interests have determined to organize all industrial and mercantile labor, and having organized it, to establish a universal closed shop. The government of the United States has given its support by law to this movement through the Wagner Act. Labor has discovered a new and very deadly weapon, the sit-down strike. And local governments have not seen fit to protect industry against this weapon. It would appear that at this stage the owners of industry are powerless to resist this tide. Therefore the future of industry depends on the policies of a dominant labor element. It is a serious situation, undoubtedly. In it are definite possibilities of injury to industry and to the standard of living. I personally am inclined to believe that with power there will come responsibility, and if not, then the government of the U. S. will in the end be forced to exercise a control that will prevent disorder and destruction in industry.

There is a third danger to recovery. It is the danger of unsound and unfair legislation, both Federal and State. We already have on the statute books legislation whose final results no man

Continued on page 62

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The Situation in Steel

EVOOLUTION IS TOO slow to suit the American taste today. We want to go places in a hurry. Change is the order of the day.

Up to noon on April 1, 1937, there had been introduced in this present Congress, a total of 8,090 pieces of proposed legislation. Most of these bills—and the average is 13 apiece for each lawmaker—have to do with some change, modification or regulation of ways of doing business. Many of them would affect the steel industry, if carried through into law.

Fortunately for us, Congress is not as efficient as is our Supreme Court in keeping up with its docket. For to date but 10 of these measures have been enacted into law. Eight thousand and eighty of them are still behind the bars but clamoring to be released to roam the fields of American business.

When industrial and business changes are brought about by mandate and by legislation, instead of, as formerly, by the natural progress of evolution, the buyer and the consumer are the ones most likely to suffer. For they are losing their rightful former positions as the promoters of industrial change and improvement and surrendering them to the dictatorship of the politician and the demagogue.

The consumer is the logical and the rightful boss of American industry. He is the man who pays the bills. His desire for continuous improvement in quality of products and for reduction in costs has spurred American industry to unparalleled peaks of accomplishment. He is the man who has dictated the policies of great and small corporations; who has commanded the erection of new plants or the modernization and relocation of existing ones. The steel industry has been one of our many progressive American industries which have long recognized the consumer's natural and predominant right to the head seat at their tables.

JOHN H. VAN DEVENTER

Editor, THE IRON AGE

The consumer has earned that seat at industry's table because industrial evolution, operating through the natural laws of competition and initiative, has put him there. He has been the man who in both the literal and the metaphoric sense has given the orders. Because of this, he has been able to protect his interests. His voice has been heard and heeded.

Today, the consumer is being ejected from the head seat at industry's table. It is not through any desire or action on the part of industry that this is taking place, for industry values its consumers. It is the inevitable result of the discarding by Government, of the natural law of industrial evolution.

For an industry that started scarcely two centuries ago in America with a single product, charcoal iron, the steel business has grown to be a remarkably complex one. No industry has more variety of product. The American Iron and Steel Institute during code days, for example, listed prices on more than 100,000 shapes, sizes and compositions of steel, and this in the standard, "run-of-mill" portion of the industry. When it comes to special alloy steels, the number becomes almost infinite. One producer of alloy steels, for example, is prepared to furnish over 1,800 composition varieties.

Equally complex, of necessity, are the merchandising methods. These, like the technical branching out of the industry, have been the result of evolution. And evolution, in both making and marketing methods, has been inspired through good sound business sense, by the desire to render better or fairer service to the American steel consumer.

Many of these marketing methods, built slowly and through long experience and for the mutual benefit of consumers and producers, are now threatened with destruction or serious modification by Government mandate. And if these changes should be brought about, 99 out of every 100 steel buyers and consumers will be penalized for every one that will benefit.

Take, for example, the basing point system. This system equalizes the price competition for steel among widely distributed buyers and consumers. It is of primary benefit to that great majority of steel consuming units which are not or cannot be located near steel producing centers, and to the smaller producing units which cannot afford a widely distributed chain of producing plants. If, as threatened, steel is forced to merchandise its product on an f.o.b. mill basis, steel consumers and fabricators who do not happen to be situated close to mills or who cannot move there would be penalized, competitively, from \$2 to \$8 per ton.

You have another striking example of a change forced upon the industry against its will which is bound to seriously affect your interests. Tremendous pressure is being applied, through a combination of legislation and supposed executive mandate to "close shop" a traditionally open-shop industry.

Do not make the mistake of thinking that the steel industry begat this expensive foundling. It was sired by John Lewis, godfathered by Senator Wagner, nursed by Madame Perkins, pronounced legitimate by the Supreme Court and blessed by the Administration. Then it was carefully tucked in a basket and

handed to the steel industry with a tag attached to it reading "take it and like it."

The steel industry does not want this baby because it cannot afford to support it. No industry would voluntarily adopt a cost rise that may run into ten figures, especially when it is earning only $4\frac{1}{2}\%$ on its capitalization.

The cost of this closed shop baby does not lie so much in the wages that it may exact from its custodians. Increased wages are not so costly as decreased efficiency. And production efficiency cannot help but be seriously damaged when labor leaders take control of production rates and can say "no" to modernization and mechanization.

Do you imagine that there would have ever been the introduction of the continuous mill in this country if steel had been a "closed shop" industry?

The steel industry cannot afford to support this foundling. So it will have to be passed along and put on the steel buyer's doorstep. And the steel buyer, similarly unable to afford the luxury of this expensive child, will have to pass it along to the final consumer, to whom go all of the bills, of necessity, for industrial babies that are born outside of the normal and natural wedlock of industrial evolution through improved efficiency and lower costs.

Can you call to mind a single instance in which organized labor has taken action to confer a price benefit upon consumers of an industry in which that labor makes its living? The fact that you cannot is the most condemning indictment in my opinion, of the quality of union leadership and of the economic purpose of today's unionism.

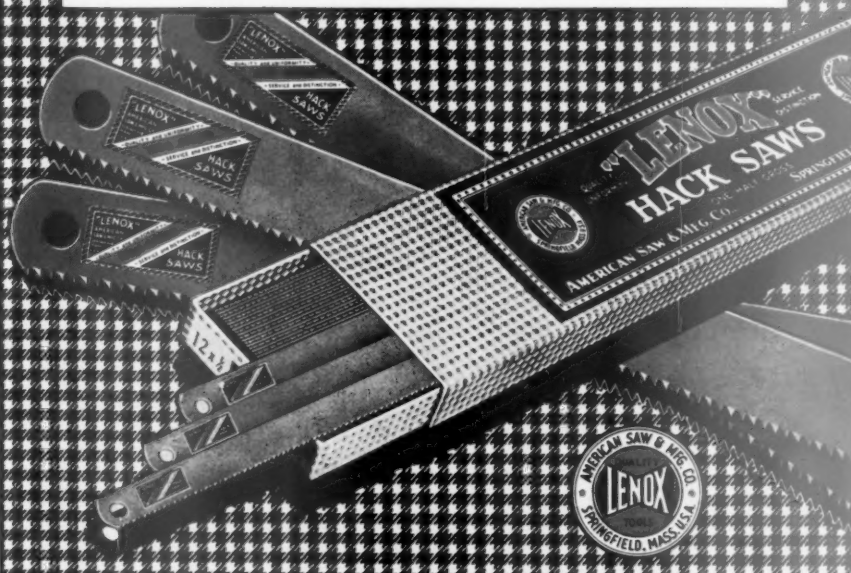
Unregulated and undisciplined organization of minority groups as pressure groups to secure a group advantage is not new. It is not confined to America. But wherever it is permitted or encouraged to work its unrestricted will, the great mass of consumers suffer social or economic damage.

The statute books of our country are full of laws to regulate and control and limit the organization of

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business, but there are no laws on our books to regulate, control or limit the organization of labor or its activities. Therein lies the most serious present-day threat to the American consumer.

We call these activities as practiced in China by their true name — banditry. In America similar activities are called in certain quarters by a more euphonious title—the development and expression of social consciousness!

If you think that the consumer can afford to pay twice as much, per ton, for steel, two years from now as he does today, you and he can well afford to remain quiet and complacent. If you believe, however, as I do, that such a contingency would

be likely to put you out of business, or at best result in serious injury, then it is time that you should do something about it before it is too late.

Do not mislead yourselves in thinking that the present activity of demand in steel represents a normal demand. Your customers have just emerged from a five-year starvation diet. A starving man will pay nearly all that he has for a square meal, but after his stomach has been filled he is going to count the pennies left in his pocketbook.

It will be a sad day for America when King Consumer abdicates and is succeeded by political economic dictatorship. And saddest of all for

Continued on page 62

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2nd—J. W. Nicholson, City of Milwaukee.

3rd—James MacPherson and Lyman Waters of the Standard Oil Company of California, San Francisco.

New Orleans Attendance Cup—Houston Association.

Chicago Association Publication Award—*The Philadelphia Purchasor*, official organ of the Philadelphia Association, and Harold I. Patten, Editor.

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Most Informative exhibit—Youngstown Sheet & Tube Co., Youngstown, Ohio.

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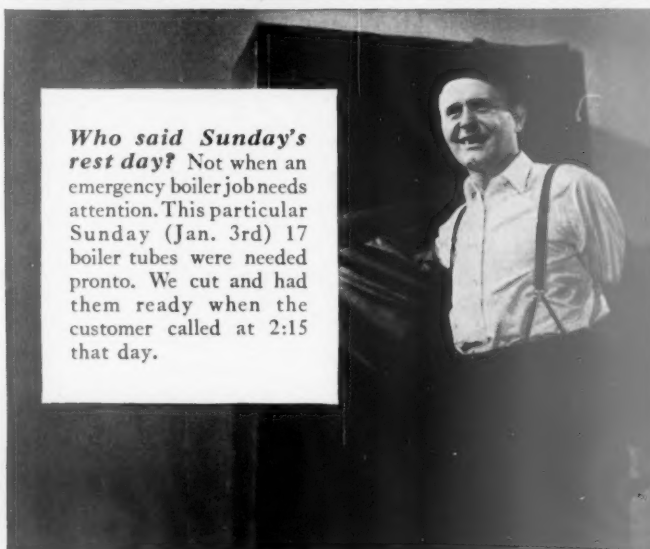
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Do you find it hard to get your steel orders filled these days when mills are choked with orders? Try Scully. Our huge stocks are quickly available. We have immense stocks of steel, steel products, copper and brass always on hand in eight warehouses conveniently located.

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Double Guaranteed WIPING CLOTHS



The Label of the Sanitary Institute on a bale of wiping cloths carries with it four definite guarantees. These are:

STERILIZATION

SPECIFICATION PACKING

CORRECT WEIGHT

FAIR DEALING

THESE GUARANTEES ARE BACKED

(1)

By the *individual member* who is privileged to use the Institute label only so long as he rigidly observes the specifications he has pledged his firm to maintain.

(2)

By the Sanitary Institute itself—the national trade association of sterilized wiping cloth manufacturers with members in fifteen states. Penalty for failure to maintain Institute standards is expulsion from the Association.

Despite this "Double Guarantee", products of Institute members cost no more than unlabelled wipers. Why gamble when you have nothing to gain? **DEMAND THE INSTITUTE LABEL ON EVERY BALE!**

For complete Institute specifications write any member or The Sanitary Institute of America, 10 S. La Salle St., Chicago

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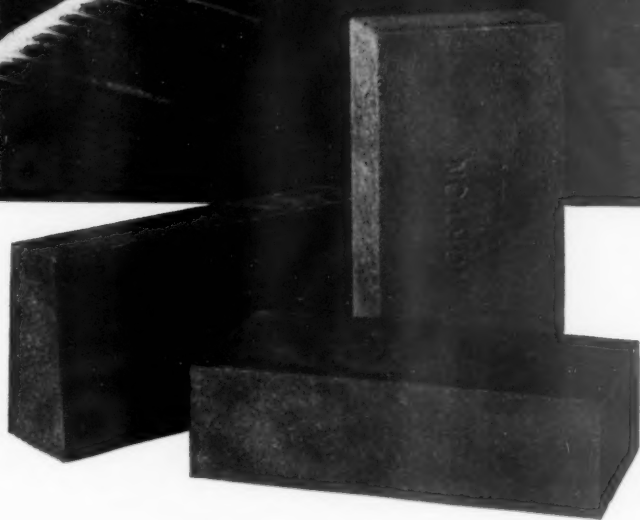
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Date.....193....	
This is to Certify that the manufacturer of this bale or package of wiping cloths has complied with all rules and regulations of the State and City Health departments along with the regulations of the Board of Underwriters and the City Sealer.	
I, or, We certify that the wipers contained in this shipment are correct in weight and have been thoroughly washed and boiled in a solution containing pure soap—76% Caustic and / or Chloride of Lime; and dried in an average temperature of better than 212 degrees Fahrenheit.	
This affidavit is used in common with other members and complies with all recommendations set down by the Sanitary Institute of America.	
Subscribed and Sworn to before meProducer
this.....193....Supt.
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Lower Lining Costs...



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Worcester, Mass.
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THE illustration shows the interior of one of two boilers in a large municipal auditorium. The ordinary brick originally used in the boilers lasted only one year. Then Crystolon Brick was installed. The untouched illustration shows this brick after a year of service. It is as good as the day it was installed—many years of service left. The firemen report, "no trouble from clinkers—what few adhere are easily removed without injury to the brick faces."

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NORTON
REFRACTORIES

R 556

NORTON

The Bituminous Coal Act of 1937

ON APRIL 26, 1937, there was inscribed on the statute books of the United States, the Bituminous Coal Act of 1937, a law written to regulate commerce in coal so far as such regulation comes within the power of the National Government; a law which is intended to aid in the stabilization of an industry which serves as a major source of heat and energy for the nation, which in the production phase alone furnishes a means of livelihood for approximately half a million men, which creates millions of dollars of buying power annually, and upon which hundreds of communities throughout twenty-eight states are dependent for their prosperity.

The first major function of the Commission administering the act is to determine and prescribe minimum prices for all grades and sizes of coal sold in commerce subject to the Act. Such prices are minimum prices only and are not the prices at which coal producers are compelled to sell their coal. There is reserved to every industry member the right to obtain a greater realization for his coal, subject only to the power and duty of the Commission to establish maximum prices when the public interest requires such action. These minimum prices are not to be arbitrarily established but in general are to be based upon the weighted average cost of production within certain areas. The term cost is specifically defined in the Act and does not include any item by way of profit to the producer.

We should need no law in the coal industry to teach us the sound rule of economics that the producer of a commodity must sell it at a price which will at least return the cost of production. But no matter how you may try to explain or excuse it, the fact is that the large majority of coal producers have measured and continue to measure their success in terms of tonnage and not in terms of profits. The Act does not attempt to prescribe prices for each individual mine based upon its particular costs but uses the weighted average for the entire tonnage in a district as a proper basis for minimum prices. It further provides that all coals are to be classified. The Act clearly recognizes that there are distinctions in value and that there must be differences in price between various sizes and grades of coal.

The Commission is required to set up Statistical Bureaus in each of the twenty-three Districts throughout the producing fields of the country and to these District Bureaus, which are not operated by the coal industry but by the Commission itself, each producer must file detailed reports of his costs of production. From these reports the Commission is provided with the weighted average cost of the District and in turn the weighted average cost of the price area is determined. The Act clearly and specifically recognizes the many factors which necessarily are involved in a proper price determination. The Commission must also take into account the competitive relationship between coal and other forms of energy so as to preserve to producers as

CHARLES F. HOSFORD, JR.

Chairman

National Bituminous Coal Commission

nearly as practicable existing fair competitive opportunities. In other words the Commission is vested with broad discretionary power to apply the theory of returning cost of production to the operators but with due regard for all the conditions which actually exist in the markets. The price provisions of this Act are not the dream of some inexperienced visionary nor are they parts of some untried scheme devised by novices, but represent years of study by the best minds in the coal industry and are really a restatement of the method by which prices have been arrived at when parties within the industry have attempted to deal cooperatively with their marketing problem.

There are some men in the coal industry who apparently believe that this law will create a millennium for bituminous coal, but nothing could be farther from the truth. The operator retains the full benefit of his own individual initiative. If he expects to run his mine, he must continue by his own efforts to sell his coal. The law does not guarantee either tonnage or an operating profit. The law does not and cannot seek to avoid the seasonal variation in production and demand which will always be a substantial factor in the industry. Neither the Act nor the Coal Commission attempts to deal with control of production, and no power of government can ever meet conditions of shortage which arise when panicky coal buyers expect their demands to be met immediately in the depth of winter.

Under Section three (3) of the Act, there is levied a tax of one cent per ton upon all coal produced, in order to derive sufficient funds for the proper administration of the law. Certainly if a great nation-wide industry can be stabilized at so small a cost, no buyer of coal should be heard to object to the small price increase which the tax will occasion. The 19½% tax imposed as a method of enforcement, certainly cannot and should not in any manner be laid upon coal consumers. If, in the past, the buyer of coal has been paying a fair price, recognizing that producers must realize a figure approximating costs of production, then there is little occasion to be concerned about the effect of the Act.

The operation of the new Act will be of unquestioned benefit to buyers of coal. It bans many unfair trade practices, and the establishment of minimum prices by the Commission will tend to stabilize market conditions and avoid the wide fluctuations in price, which at times in the past have been a source of concern to the buyer. Runaway markets, such as have taken place in times of emergency, can and will be avoided by the establishment of maximum prices wherever necessary.

In addition to the functions of prescribing minimum and maximum prices, the Coal Commission has other duties to perform which will render a real service to the buyers and the consumers of coal. The commission is empowered not only to conduct research on the subject of coal and its uses but can also render effective service by coordinating research activities of many public and private agencies. We have a real problem of conservation of coal in this country, which too many of us have chosen to ignore. Students of the coal industry estimate that at our present rate of production we are wasting and losing permanently, a minimum of one hundred fifty million tons of coal annually, a loss which can never be repaired. In the bituminous coal industry, as in other natural resource industries, there is a growing tendency toward concentration of the industry in the hands of a few interests. Those who talk about maintaining free competition and who rage against monopoly had better examine the record of bituminous coal for the past ten years and I believe that they will find monopoly to be the ultimate destiny of the industry unless Government continues to intervene and maintain a state of free competition in the industry.

Our Commission can and will render valuable service to coal consumers. When the Commission was appointed under the Coal Act of 1935, it was the first time in the history of our industry that bituminous coal and coal consumers had an impartial representative to speak on their behalf at the seat of Government. For years, the subject of coal freight rates has been one of vital concern, both to the coal producer and the coal consumer. I deem it one of the most important duties of the Commission to appear in behalf of the industry and of coal consumers, before other agencies of the Government and to insist that the general level of coal freight rates be reduced to the point where we bear only a fair share of the transportation burden.

The Coal Commission has another duty to perform under the Act, namely, the regulation of marketing agencies formed by producers of coal for the cooperative selling of their output. The law offers to coal producers the opportunity to organize themselves and to regulate their own business, but this must be done under the watchful supervision of the Commission in order to protect the interests of the coal buyer and the consuming public. If the coal men will appreciate the opportunity afforded them to put their house in order, to end their senseless competition in tonnage, to eliminate unfair trade practices, and to restore the coal industry to a basis of respectability and reasonable profit, I am sure that the industry will have the wholehearted cooperation of the Commission in accomplishing that result.

The Act makes adequate provision for every interested person to appear before the Commission and speak on his own behalf. Our Commission expects that the members of this Association and of every other organization which includes buyers of coal in its membership, to assume the responsibility which the law imposes upon them and invites your cooperation and support.

The Operator's Viewpoint

J. D. A. MORROW

President
Pittsburgh Coal Company

THERE ARE TWO chief reasons why men in the industry who opposed the old Act are not opposing the new law. In the first place, the old Act had no adequate Court review to protect operators from the imposition of prices that might ruin their business before such errors in price fixing could be remedied.

In the second place, the former Act contemplated as a practical matter the sale of coal by the industry at cost. The new Act, after providing for protection against destructive competition by the fixing of minimum prices that will guarantee at least cost to the industry as a whole, goes on to permit the voluntary establishment of general sales agencies, subject to approval by the National Bituminous Coal Commission. These sales agencies provide the machinery by which bituminous coal producers in cooperation with each other can establish their business on a profitable basis.

Here is a new program for coal. What its ultimate consequences may be, I shall not hazard a guess. At the moment it is enough for us to know that here is a law which imposes on us as citizens and as members of this industry certain responsibilities and obligations, which will be accepted and discharged to the best of our ability.

There will be many administrative difficulties in applying this Act.

The Act requires that the coal produced by all subject mines shall be classified as to quality and that minimum prices shall be fixed on the various sizes, kinds and grades of coal f.o.b. the mines, so as to maintain fair competitive relationships and provide as nearly as possible an equal value and therefore an equal sales opportunity at every point where coal is delivered to customers.

Coal differs as to quality and desirability on account of variations in moisture, ash, volatile matter, fixed carbon, sulphur, phosphorus, fusion temperatures, friability, size, etc. and so on. Also its suitability differs between you as you have different kinds of equipment in your plants, require the coal for different purposes and use it under different conditions of boiler load or plant operation.

East of the Mississippi River alone there are 40,000 different sizes, kinds and grades of coal to be classified and priced. These sizes must be so priced as to be in proper relation to each other at 40,000 different delivery points. Each of you in your plants may have special situations so that the identical coal may be worth more

Continued on page 68

REFRACTORIES

Dr. JOHN D. SULLIVAN

Chief Chemist,
Battelle Memorial Institute,
Columbus, Ohio

REFRACTORIES MAY BE classified both by physical nature and chemical character.

Physically refractories may be classed as preformed shapes, or loose material. The former includes such materials as brick, blocks, sleeves, nozzles, tuyere refractories, and special shapes. Loose material includes grain, plastic refractories, mortars, ramming mixtures, cements, and the like.

Chemically refractories may be classed as basic, neutral, or acid. Dolomite and magnesite refractories are basic. Chrome, silicon carbide, and carbon are neutral. Fireclay, alumina, mullite, and silica are acid. In general, basic refractories are used in contact with a basic slag

and acid refractories in contact with an acid slag or glass. Sometimes because of refractoriness, ability to bear load at high temperatures or other properties, refractories are used in furnaces operating under different conditions than their chemical nature calls for. Examples of this are the use of silica brick in roofs and upper parts of basic open-hearth steel furnaces and use of fireclay brick for lining open-hearth steel ladles.

Raw Materials

The fireclays from Pennsylvania, Ohio, Kentucky, and Missouri are the chief sources of supply of raw materials for fireclay brick. Diaspore clays from Missouri and kao-

lin from Georgia are the chief sources of supply for high alumina and kaolin refractories. Silica brick are made largely from ganister from Pennsylvania and Wisconsin and to a lesser extent from that in Alabama and Colorado. Some silica brick are made from the Sharon conglomerate in Ohio. Most magnesite used in brick manufacture is imported chiefly from Austria, Czechoslovakia, Greece, and Russia. California magnesite is used to a lesser extent. Washington magnesite is used extensively as grain material for use in bottoms of open-hearth furnaces. Chrome ores from Turkey, Russia, Cuba, Africa, and Greece are used. The chief source of kyanite is India, although there is some domestic production in North Carolina.

Clays are mined by open-pit or underground methods. Underground mines are opened either by tunnels or shafts. Chrome ore is obtained both by quarrying and mining, depending on the nature and size of the deposit. The crude ore is often hand-picked and sometimes mechanically concentrated. In California most of the mining has been by underground methods. Ganister for making silica refractories is usu-



ally found in loose flows. The larger pieces are broken in place and the material is loaded in cars.

Methods of Forming

Fireclay refractory articles are usually formed by the soft-mud, stiff-mud, or dry-press process. The first, however, is used only to a limited extent in refractory manufacturing, although it is widely employed in making common and face brick.

In the soft-mud process sufficient water is added to give the maximum amount of plasticity. The raw materials are mixed in a wet pan or in a pug mill. Soft-mud brick or shapes are sometimes molded by hand. Hand-molded brick are usually re-pressed in a hand press after drying about a day. More often, soft-mud brick are made by machine. These brick also are usually re-pressed. Soft-mud brick generally have a rather coarse structure, but they have good resistance to thermal spalling.

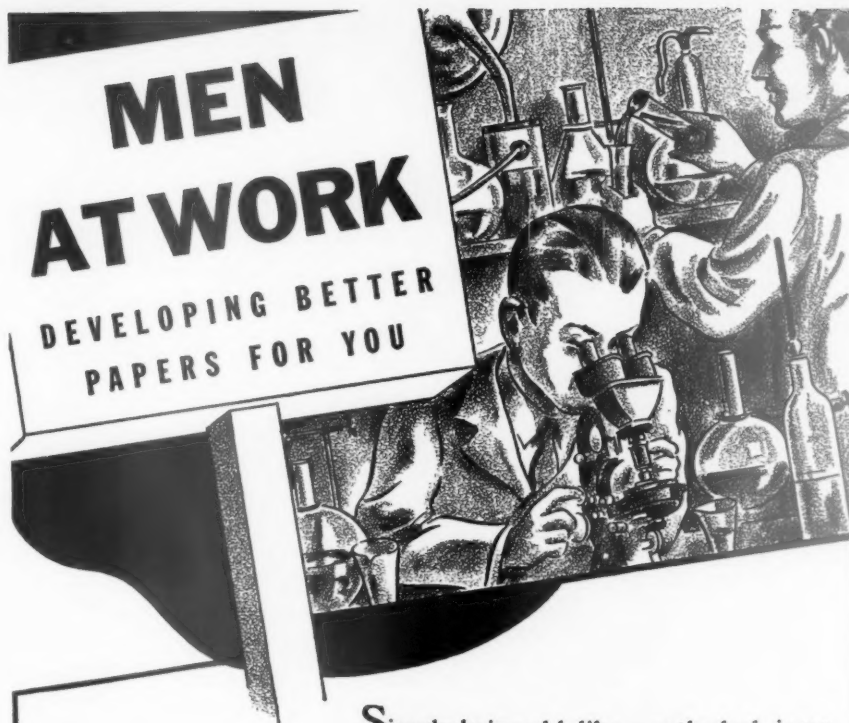
In the stiff-mud process the water content is sufficient to make the mass plastic, but considerable pressure is required to form the clay. The clays are mixed in a wet pan or pug mill. A column of clay is forced through a die by means of an auger. After emerging, the column is cut into the desired size by a wire cutter. The brick are usually re-pressed directly after the wire-cutting operation. Stiff-mud brick have a dense structure and in general are good for resisting abrasion and slag. Stiff-mud brick are also hand made.

In the dry-press process only 5 to 10% of moisture is added. Considerable pressure is required to make

Continued on page 58

Market Place

Because of the extensive commodity and market discussion included in the various convention papers appearing in this issue, the usual "Market Place" report is omitted. It will be resumed in the July issue and will appear regularly in the following months.



Simply being old, like a cathedral, is no recommendation for a business. There must be a never-ending search for better methods, better materials. There must be tradition *plus* experiment, something old but always something new. We here at McLaurin-Jones realize this necessity. That is why the good old business-holding methods of the past, combined with the business-getting progress of today, keep McLaurin-Jones Company driving ahead.

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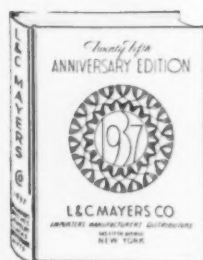
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Diamond Prices in world markets have advanced as much as 15% since January 1. We will maintain our present low prices as long as we possibly can. It would be advisable to place your order soon.



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PERSONALITIES in the NEWS

J. R. WATTS, Assistant Purchasing Agent for the Louisville & Nashville Railroad Co., Louisville, has been named General Purchasing Agent to succeed H. T. SHANKS, who is retiring on account of ill health.

E. C. WILLIAMS, for the past 25 years purchasing agent at the main plant of Thompson Products, Inc., Cleveland, has been appointed Director of Purchases for all units of the company.

G. T. WALKER, SR., has been appointed purchasing agent for the Georgetown, S. C., mill of the Southern Kraft Corp. His offices are at the Florence Trust Building, Florence, S. C.

WILLIAM J. DONNELLY, for the past six years purchasing agent for St. Luke's and Children's Hospital, Philadelphia, has been named superintendent of the Princeton, N. J. Hospital.

WILLIAM R. STROUD, for thirty years purchasing agent for Consolidated Ashcroft Hancock Co., has been appointed treasurer of Joseph H. Lederer, Inc., Bridgeport, Conn.

GEORGE C. BESTICK, Purchasing Agent for the Heald Machine Co., Worcester, Mass., has been elected president of the Lions Club of that city for the ensuing year.

A. G. RUDDER, long time purchasing agent at the Central Rubber & Supply Co., Indianapolis, is attending the convention of Rotary International at Nice, France.

J. L. ROSER, formerly purchasing agent for the Donaldson Lithographing Co., Newport, Ky., is now assistant superintendent of the Erie (Pa.) Printing & Lithographing Co.

RALPH W. MYERS has resigned as purchasing agent and operating manager for Hobbs, Wall & Co., San Francisco, to become manager of the Shipowners' Association of the Pacific Coast. Mr. Myers has been president of that association while with Hobbs, Wall.

WILLIAM V. BROOKS has been appointed district purchasing agent for the Standard Oil Company of California at Los Angeles, succeeding the late EMIL STEIGELMAN. Mr. Brooks has been chief buyer for the company.

C. M. WAYNICK has been appointed Director of the Division of Purchase and Contract for the State of North Carolina, with offices at Raleigh.

MISS ADELAIDE HEBERLING has been appointed deputy county purchasing agent for the WPA at Rochester, N. Y., succeeding LEO MOONEY.

JOHN G. ARIKO, formerly with Albert Pick-Barth Company, New York, has been appointed General Purchasing Agent for the Dr. P. Phillips Company and affiliated interests, of Orlando, Florida.

A. D. MOSS, Director of Purchases for the B. F. Goodrich Co., Akron, Ohio, is one of a group of thirty-seven officials and employees in that company recently honored for long service, all having joined the Goodrich organization prior to 1900. Mr. Moss came with the company in 1899.

JOHN E. DUNBAR has resigned as assistant general manager of the Aviation Mfg. Corp., Williamsport, Pa., to become purchasing agent of the White Motor Co., Cleveland, effective June 1. He was formerly (1919-1922) purchasing agent of the Lycoming Foundry & Machine Co.

Obituary

ROBERT L. DISBROW, 52, Purchasing Agent for Wilcox & Gibbs Sewing Machine Co., New York, at his home in Mt. Vernon, N. Y., May 3rd.

HAROLD P. DANGERFIELD, 24, formerly assistant purchasing agent for the University of Utah, found May 15th in City Creek Canyon. He had been missing since November 4th.

WILLIAM DARWIN BUGBEE, 65, Purchasing Agent of the Onondaga County Home, Syracuse, N. Y., May 15th, of a heart attack.

JAMES J. ROCHE, 70, Purchasing Agent of the Public Service Co., St. Louis, May 19th, at the company offices.

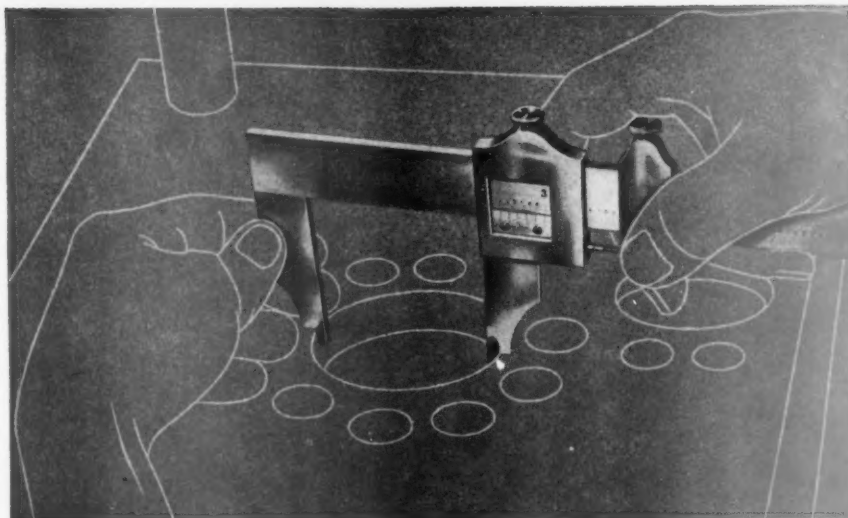
VICTOR LUKAS, JR., 31, Purchasing Agent for the Brown Shoe Co., May 19th, at Mount St. Rose Hospital, St. Louis, where he had been receiving treatment for several weeks.

JOHN R. LUND, 47, for fifteen years purchasing agent of the Irving Trust Co. of Manhattan, May 20th, at the Caledonian Hospital, Brooklyn, after an extended illness.

CAPTAIN MICHAEL FRANCIS LOUGHMAN, 70, for seventeen years purchasing agent of the Plant Railroad System, Florida, and for the past three decades active in the public service of New York as State Commissioner of Taxation and Finance, Commissioner of Public Works for New York City, and interim Borough President of Manhattan; May 23rd, at St. Luke's Hospital, New York, after a brief illness.

B. F. CURTIS, 65, Purchasing Agent for American Bemberg and North American Rayon Corporations, Elizabethton, Tenn., May 27th, at a Baltimore Hospital, after a two months illness.

JUNE 1937



Exactly 2.400"

There are no "ifs, ands or buts" about a reading from the vernier on a Starrett Shop Equipment Tool. The clean, sharp graduations say what they mean clearly and distinctly. And that goes for Starrett Micrometers and Dial Indicators, too.

An investment in Starrett Shop Equipment Tools is an investment in greater accuracy. That's why it pays to standardize on Starrett. You'll find anything you need among the more than 3000 fine precision tools and dial indicators shown in the revised edition of Starrett Catalog No. 25P. Write for your copy.

The L. S. Starrett Co., Athol, Mass., U. S. A.
World's Greatest Toolmakers—Manufacturers of Hackaws! Unexcelled—Steel Tapes, Standard for Accuracy

Standardize on
STARRETT TOOLS
 BUY THROUGH YOUR DISTRIBUTOR

JOHN J. MATHESON, 66, for the past nineteen years purchasing agent for J. H. Weaver Coal Co., Philadelphia, May 28th, at his office.

Educational Program Reports Progress

The educational program of N.A. P.A., including work on the proposed handbook of purchasing, has made substantial progress during the year. At a joint luncheon meeting of the Education Committee and the Committee on Organization and Procedure, held Monday, May 24, with Lee J. Bussman presiding, the entire project was reviewed and announcement was made of the edi-

torial staff now engaged in compiling the material under the various chapter headings. The membership at large was apprised of some of the accomplishments to date in three addresses at general convention sessions, covering the chapters on "General Purchasing Policies," "The Place of the Purchasing Department in the Industrial Organization," and "Organization of a Purchasing Department." General discussion following each of these papers contributed further to the material and methods of treatment, and the thirty-seven essays submitted in the 1937 N.A.P.A. prize contest will be analyzed for their actual case material on organization and procedure.

PAGE 55



COOLS INSTANTLY

Just as the ocean breeze drives away the heat and gives renewed energy—so will GRAFO, "TODAY'S LUBRICANT FOR TODAY'S INDUSTRY," reduce the temperature of hot bearings and keep them running cool.

Protect Your Machinery From Destructive Friction. Friction causes heat! Heat causes your lubricants to thin and lose their value! Thinned lubricants permit scoring, metal to metal contact with consequent seizing. Seizing causes large repair bills and stops production.

GRAFO, containing pure colloidal graphite, may be obtained in either a concentrated or semi-concentrated form. When added to your regular lubricating oil, grafoid or frictionless surfaces are formed on all bearings, defying any heat under the temperature of the electric arc.

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SHARON, PENNSYLVANIA

New Chemical Packages

HUGH CRAIG

Managing Editor
Oil, Paint and Drug Reporter
New York

TO GET THE corrosion-resistance of stainless steel without paying the cost of a stainless steel drum is a problem in which many shippers of chemicals have expressed keen interest. To meet this problem manufacturers of drums have engaged in the development of ordinary steel drums with an interior surface of stainless steel.

It is not difficult to make a sheet of steel clad on one side with stainless steel; but to fabricate a drum from this laminated sheet has not been found easy—it is difficult to make a weld with the whole exposed surface of stainless steel.

Drum manufacturers have turned to making stainless steel slip-in liners for drums of ordinary steel. This double drum was first developed as an open-head container, and is largely used as a container for fruit products in California. The head is usually of stainless steel.

The Petroleum Iron Works Co., Sharon, Pa., is making a closed-head drum with a stainless steel lining. It offers, among others, an 18-gauge I.C.C. 5 drum of this type. The stainless steel liner is carried over the top rim of the steel casing and the stainless steel head is turned down over this and crimped so that

the entire inner surface is of stainless steel. The plug is of stainless steel.

I do not have the prices of this drum, but I am informed that in 16-gauge the price of a drum with a liner is about one-half the price of a solid stainless steel drum; the price of a drum made of stainless steel-clad steel is about 65% of that of a solid stainless steel drum.

Seamless chime construction is the outstanding feature of the Hackney two-piece drum made by the Pressed Steel Tank Co., Milwaukee. It is lighter than the ordinary drum, without sacrifice of strength. There is no chance of chime leakage, and cleaning is facilitated. It is specially pickled and is said to eliminate discoloration in a number of uses, particularly as a container for aqua ammonia and other caustic alkalis, and for silicate of soda.

The flange is one of the most important things about a metal drum; also it is often one of the greatest sources of trouble. Welded flanges are said by many shippers to be the only sort to have on returnable drums—and these commenters are not wholly convinced that the pressed-in flange is satisfactory even on one-trip drums. Their criticism is not without foundation, as all know who have tried to loosen a plug that has been set too vigorously or has become cemented by the contents of the drum.

The old wooden barrel holds its own in certain fields. The only new idea I have been able to find is the setting of the staves by indirect heating. This avoids the charring of the interior of the barrel and removes the possibility of discoloring the contents.

The rubber drum introduced a year or so ago possesses desirable qualities. The use of rubber in bulk containers has been developed along other lines. The Manhattan Rubber Manufacturing Division makes a rubber compound that is applied as a permanent lining in tankcars and drums. U. S. Rubber Products, Inc., makes detachable rubber liners for drums, and similar rubber bags are made by the Goodall Rubber Company.

Metal-coated paper linings have been developed by the Reynolds International Corp., for use in metal, wood, and fiber containers. The metallated surface can be placed inward or outward. These liners are impervious to moisture, light, and air and avoid leakage. They are proof against insects and prevent absorption of odors and the loss of flavor. They have been found specially suited for the packing of aromatic chemicals.

Petroleum

(Continued from page 39)

the steam rate, the regulation of the governor and possibly the resistance of the parts to certain kinds of corrosion. The manufacturer assumes full responsibility for the performance, and the purchaser plays no role whatever in the design and construction.

All manufactured articles of consequence have elaborate design specifications but rarely are these found in the files of the purchasing department. Exceptions to this latter comment unfortunately must be made in respect to oil and paint. I will leave the paint situation for those who are handling the marketing of this commodity; they also have their troubles. The so-called standard petroleum specifications are essentially design specifications and as such are of use to a refiner for control operation, but they represent only a minute fraction of the knowledge, skill and experience which must be incorporated in the manufacture of a superior petroleum product. They make little pretense toward serving as a performance specification although the purchasing agent should be more interested in the performance of an oil than in its method of manufacture. Probably the greatest value of these specifications is for standardizing the procedure for a few of the routine tests made daily in the petroleum laboratory; in other words they constitute a useful laboratory manual for the beginning student.

Many purchasing agents are familiar with the difficulty of purchasing petroleum under the present standard design specifications and so have attempted to modify these specifications by introducing variations or by adding further complications, or by requiring unorthodox performance tests the meaning of which is obscure even to the experienced petroleum technologist. One might list thousands of examples of this character, such as specifying a viscosity tolerance which is a hundred times smaller than the changes in viscosity due to normal variations in operating temperatures; such as limiting the vapor pressure of an industrial oil to thousandths of millimeters where the only useful purpose of such a limitation would be for a molecular pump, with a volume production to be reckoned in pints.

We therefore turn to performance specifications and new difficulties are encountered. The petroleum manufacturer is probably more anxious than the customer to have laboratory test machines which will quickly rate an oil according to performance and service in a commercial installation. Much of the engineering work of a petroleum laboratory is directed toward the design and construction of testing machines of this type. In many cases different machines originally designed for the same general purpose, will rate a series of oils in different order. We have recently built a large group of lubrication dynamometers, engine dynamometers, bearing test machines, gear testing equipment, and the like, which were designed to test a full size bearing, engine, or gear under as nearly practical operation conditions as it appears possible to obtain in the laboratory. Meanwhile we are approaching the various petroleum problems from the fundamental standpoint of mathematics, physics, and chemistry. This combined method of attack is yielding valuable results.

The purchase of petroleum upon design specification presupposes that you know more about the material than the organization responsible for its manufacture and sale. You are pitting your information against

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the accumulated experience of petroleum and lubrication engineers who, in their capacity as technical salesmen, are devoting their lives to the investigation of performance records in numerous industrial plant installations. You are pitting your knowledge of the functional properties of petroleum products against the experience of the entire technical staff of large petroleum research laboratories that employ many of the outstanding scientists of America. In certain instances it is possible that you have at your command, in your research and engineering departments, men who have specialized on peculiar applications of petroleum products and are recognized in the various technical societies as authorities in their field. These are precisely the men we wish to contact. Instead of telling the oil companies how to manufacture their products, such competent scientists will explain the specific requirements which a certain product should meet; they will present operating data showing how a particular oil may have rendered unsatisfactory service; they will conduct tests on the performance of a series of oils selected after discussing their problems with representatives of a petroleum organization. Criticism and cooperation from men of this calibre are welcomed by any petroleum company because they make for progress in technology and for efficiency in utilization. These men are not of the type of men however who when ill write their own medical prescriptions in order to save the fee of a competent diagnostician, nor do they request competitive bidding for the case.

Refractories

(Continued from page 53)

the clay particles stick together. The clays are mixed in a dry pan. The material is pressed in a power press. The product is characterized by uniform size and shape. By careful selection of grain size, products of low porosity can be obtained by this process. Sometimes special

shapes are hand-molded by employing clay of approximately the consistency of that used in dry-pressing.

Silica brick are either hand-made, drop-pressed, or dry-pressed. The hand-made brick are molded in much the same manner as those hand-made fireclay brick employing a low water content. In the drop-press process a slug of mixture is dropped from a considerable height into a mold. In the dry-press process the procedure is quite similar to that employed in dry-pressing fireclay brick.

Magnesite and chrome brick, except for special shapes, are made by dry-pressing.

Increased use of power-pressing has resulted in brick of more uniform texture, freedom from molding imperfections, and lower porosity. In pressing refractory materials at high pressures so-called pressure cracks tend to form by virtue of air entrapment. A lamination or actual crack in the brick may result. Pressure cracking may be eliminated by removal of the air prior to or during pressing. In power-pressing this may take the form of evacuating the mold box or of displacing the air by a gas such as butane which is easily condensed on application of pressure. In extrusion methods, vacuum is applied to the chamber between the pug mill and the extrusion auger. De-airing has improved power-pressed brick and has permitted higher pressures. Employment of vacuum de-airing in production of extruded stiff-mud brick has also resulted in a product of better texture, density, and freedom from imperfections.

Firing Refractories

Most refractories are fired after proper drying. Firing may be effected in either periodic or tunnel kilns. The degree of firing or burning varies with the product. In general, lower temperatures are used for clay refractories than for basic or neutral ones.

Unfired magnesite and chrome brick are also widely used. These brick are made by the dry-press process and are merely dried and not fired after fabrication. They

are installed in furnaces in that condition.

The high point of production (exclusive of high alumina brick and special shapes) was slightly over a billion brick in 1926, while the low point of 217 millions was reached in 1932. Statistics are not available for 1936, but it is estimated that the production of 1936 and 1937 will be of the same order as that of the late 1920's. Prices dropped from 1930 to 1934 when production decreased. Prices in 1937 are higher than at any time since 1924.

Silica brick production reached a maximum of nearly 300 millions in 1929 and dropped to a low of 40 millions in 1932. Prices dropped slightly from 1930 to 1932, continued to rise until 1934, remained constant through 1936, and increased in 1937. The current quotation is \$51.30 per thousand in Pennsylvania and \$59.85 in the Chicago District. It is interesting to note that even in 1932 the base price in Chicago was only \$5 per thousand less than in 1929, the year of maximum production.

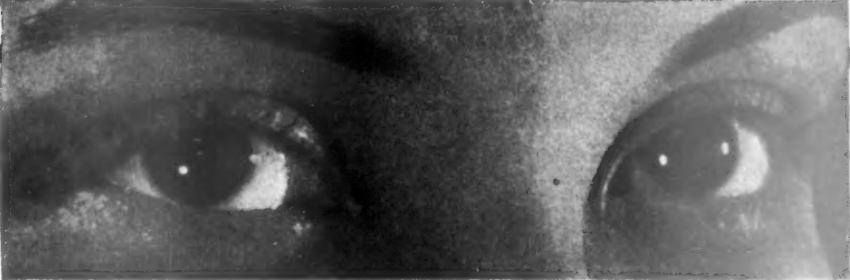
Where Refractories Go

The current distribution of refractory sales in dollars in the United States is estimated as follows:

Industry	Total Sales, %
Iron and Steel	50
Public Utilities	20
Non-Ferrous Metals	6
Cement and Lime	5
Glass	5
Oil Refining	4
Ceramic Miscellaneous	3
Miscellaneous	7

Basic brick are most widely used in the steel industry. Low-iron magnesite brick are a development of the past decade. These brick possess better resistance to thermal spalling than high-iron magnesite. They have somewhat better load-bearing capacity at high temperature.

Chemically bonded or unburned basic brick is a new product. Resistance to thermal spalling is high,




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and load-bearing ability at elevated temperatures is better than in burned brick. One brick of this type uses a chemical bond and is formed under high pressure with careful grading of particle size. Un-fired brick made by the Ritex process are hydraulically pressed and employ a refractory chemical bond. This brick also contains some chrome in the mix. The other class of unburned magnesite brick is an improved Metalkase brick and comprises a chemically bonded brick with a steel cover or shield.

Super duty fireclay brick reach a

high point in the development of strictly fireclay brick. They are made from flint clays in which incipient fusion occurs only at high temperatures. The brick are characterized by high density and volume stability. They have the greatest spalling resistance of highly refractory alumino-silicate refractories of the ordinary price range. During the past two years some manufacturers produced a super duty fireclay brick by double firing, and to a very high temperature. The so-produced brick is characterized by unusual load-bearing ability



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at elevated temperatures in addition to the other desirable properties of super duty fireclay brick. By careful grain sizing, the porosity can be lessened materially. Double-fired, low-porosity brick are being used in top courses of checkers in open-hearth steel furnaces.

Improved Quality

High alumina brick have been used in large tonnages only during the past decade. The extended use is due largely to improved qualities and to the growing demand for refractories that can withstand conditions too severe for fireclay or silica. Volume stable high alumina brick have been produced by pre-firing a large portion of the raw material at a high temperature.

There has been a general improvement in first quality fireclay brick. This has been realized by careful blending of clays and control of grain sizes. Because of better knowledge of the raw materials and improved technique in production, some manufacturers have eliminated all or a part of the plastic clay content and have thus produced brick of increased refractoriness, spalling resistance, and greater freedom from shrinkage.

The manufacturing technique of silica brick has been improved. Silica brick are truer to shape and dimensions than they were a few years ago. Introduction of power-pressing resulted in production of material freer from warpage, but the hand-made and drop-pressed silica brick are markedly superior in this respect than they were a few years ago.

Meeting New Needs

There are innumerable new so-called super-refractory brick, most of which aim at a high mullite content. In a paper of this nature it is impossible to discuss them in detail. Their sales are increasing and they are deserving of the place they are taking in the metallurgical and ceramic industries. They find widest uses in the electric furnace and glass industries.

The increased use of the power press and auger machines, especially

in conjunction with de-airing, has resulted in refractory products of better quality. Refractories are being made true to shape and dimensions. This is a decided advantage as it permits better joints in laying walls.

Improvement in one type of refractory for a given service is often followed by improvements in other types for the same purpose. A new refractory is developed for a weak spot in a furnace, but the operator pushes the furnace a little harder and weakness develops in another spot, and so on. The improvements in refractories in the last decade show that when there is a demand for better refractories the manufacturer will try to meet it.

Aluminum

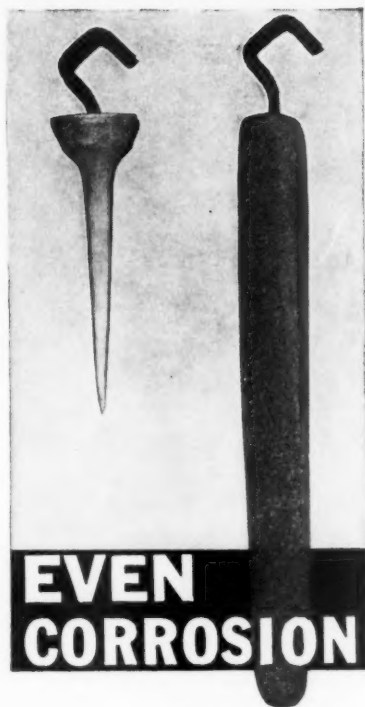
(Continued from page 34)

mineral pigments and that these dyes and mineral pigments could be sealed into the coating. This opened up for aluminum an entirely new outlet, which has materially increased the usefulness of the metal in fields of packaging and interior decoration, as well as for certain types of electrical equipment and household appliances.

More recently, an electrolytic brightening process (Alzak) was developed, which imparts to aluminum the reflectivity of mirrored silver. After the electrolytic brightening treatment, the metal is given an anodic coating, thus insuring the permanence of this high reflectivity.

There are many different types of alloys which research has developed over the period of the past fifty years. The Alclad materials, commonly employed in aircraft construction, the strong aluminum alloys used in dragline booms, streamlined trains and bridge floor systems and the new free-cutting alloys for screw machine applications, are typical of some of the newer alloys.

Economic conditions naturally change markets from time to time and for aluminum or any other material to forge ahead, it is obvious that it must keep abreast of the times, replacing markets which for



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one reason or another have become obsolete with new and broader markets for its products.

As an example in point, years ago a considerable amount of aluminum was employed in the construction of automobile bodies. The development of deep-drawing steels and the popularization of low-priced pleasure cars practically eliminated this market for aluminum, except in the case of such vital parts of the power plant as the pistons and cylinder heads. To offset the loss created here for aluminum, the use of the metal in truck and bus bodies was developed. While light weight is of economic importance in any type of transportation vehicle, it is of far greater importance in the case of trucks and buses, where economy of operation is a necessity and where maximum weight limitations are imposed by highway laws. A ton of payload added to a vehicle without increasing the gross load of the vehicle naturally tells a dollar-and-cents story that fleet-owners cannot overlook.

And now for a word regarding price. At the time of Hall's discovery in 1886, aluminum was selling at \$8 a pound; today, the metal sells for 20 cents a pound.

Over the past decade, the price range of aluminum has been steadily downward until a low of 19 cents a pound was announced in the spring of 1935. This gradual drop in price in the face of fluctuating prices in competing metals has been in progress since 1926, at which time the metal sold for 28 cents a pound.

The one-cent price advance on March 1, 1937, made necessary by the increased costs of labor and raw materials, was followed by an announcement by the Company declaring that its policy for the remainder of 1937 would be to maintain present prices and make advances only if necessary to meet increased costs of labor and raw material. This announcement was made at the time we were engaged in an expansion program amounting to more than \$26,000,000 in capital expenditure, to increase the production of aluminum. As every one knows, these capital investments

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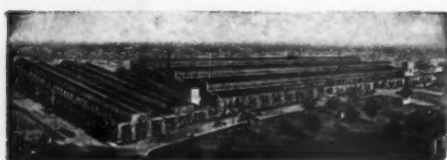
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must be paid for in the future, when a surplus of metal from foreign importers dumped into this country and supplies from the rapidly increasing scrap or secondary market may leave the Aluminum Company holding the bag. In such circumstances, it must either sell at the market price created by this competition or accumulate acres of inventory like the 300,000,000 pounds it produced and carried during the depression, when Federal reports show the annual consumption of aluminum to have been as low as 62,000,000 pounds.

Steel Situation

(Continued from page 45)

the erstwhile king, if we can judge by what has happened to him in those countries abroad which have substituted economic revolution for evolution. We must not let the consumer abdicate in America. I urge you, who are prime ministers to the American consumer, to exert your utmost power in his behalf, now, before it is too late.

In so doing you will be serving no special interest but protecting all interests of all classes of Americans. For whatever is done that will permanently benefit the consumer will benefit all of us and whatever is done that will harm him will eventually injure every man, woman and child in this great country of ours.

Yes, it will require courage, in these peculiar days, to take up the cudgels in defense of today's most forgotten man of all. But courage is the rightful heritage of free Americans. Remember with what enthusiasm we were taught to sing about "the land of the free and the home of the brave." And remember that when America ceases to be the home of the brave, it will no longer be the land of the free.

Where Do We Go from Here?

(Continued from page 42)

knows. Nobody knows what the Patman-Robinson Act will eventu-

ally do. The clumsy, awkward, uncertain Social Security Act has been legalized by the Courts. No man knows what it will do to labor, to industry, to the budget, to the securities of the United States government. The tax on the undistributed dividends of corporations is an uncertain measure, whose final effects are unknown.

In addition to those measures, there is a distinct possibility of other measures. That ragged bird, the Blue Eagle, is going to be revived in one form or another. In one way or another we are going to have Federal legislation governing hours and wages. In one way or another we are very likely to have Federal officials regimenting industry. If it does not result in a compulsory 30 hour week, it will result in a compulsory 35 hour week or a compulsory 40 hour week. A 30 hour week will hurt everybody, but it will hurt labor most of all. It would be a kind of slow national economic suicide. There is every likelihood of some more agricultural legislation. Whatever form it takes, it will most likely result in an unearned cash subsidy to farmers, paid for out of the bread and clothes of the poor. There is some likelihood of additional railroad legislation which will add further to the heavy burdens of that distressed industry. Within the states there is a widespread movement to kill the chain stores.

And finally, there is a fourth danger, the danger of a too rapid growth of prosperity. Artificially pushed forward by inflation conditions, we may have too rapid an expansion of industry. There is a long-dammed-up demand for consumer goods. There is a sudden revival of demand for raw materials and producers' goods. There is an over-supply of unused credit. There may be a feverish and unnatural industrial expansion, ending in a kind of industrial inflation. We may buy too much on installment credit. We may mortgage the future too much. The rising costs of labor and materials may result in a race to stock up in advance. And through these forces there may be an unnatural rise of

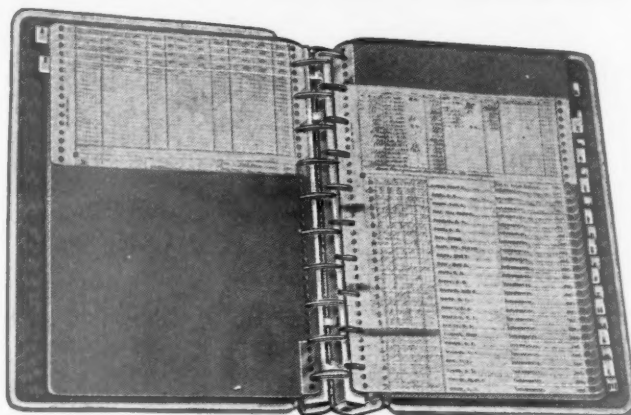
commodity prices and an unnatural rise of prices of stocks. And eventually the end of all this would be a collapse of markets and industry.

The dangers that I have outlined are very real. They are not imaginary. But I believe that we shall escape the worst of them and survive the rest. We have a tough economic system. It had to be, or we would not have survived the last seven years of depression and the New Deal. All of us tend to exaggerate the effect of government on economic life, forgetting that unsound measures tend to defeat themselves. If taxes are unreasonable and oppressive, people simply do not pay them. They evade them. If they cannot evade them, they see that they are repealed. If restrictive legislation is too burdensome it is repealed or declared unconstitutional or violated. The N.R.A. was a failure and it was dead long before the Supreme Court got to it. When labor itself finds out that sit-down strikes are a mistake it will stop them. If the Social Security Act is unworkable, it will be changed or abandoned. When a government keeps on running a deficit it eventually finds it impossible to borrow any more money and it quits. When a government keeps on inflating the currency the cost of living eventually rises and the people demand that it be stopped.

As I see it, the masses of the American people have taken over the control of government. They are electing to office men who will dance when the people crack the whip. But I still rely on the fundamental common sense of the people. You can fool them for a while, but not permanently.

After a while they go back to fundamentals. They know that economic welfare and prosperity and high wages are built on hard work and saving and investment and invention and improvements. We may have some serious disturbances. We may have some unsound and unfair legislation. But we shall survive them and go on building toward a richer and better economic America.

JUNE 1937



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AMONG THE ASSOCIATIONS

Forth Worth—J. C. Davis of T. & P. Coal & Oil Co., has been re-elected president of the **Fort Worth Association** for 1937-1938. S. J. Johnston of Acme Brick Co. and Grover Cline, City Purchasing Agent, were also re-elected to serve again as secretary-treasurer and national director, respectively. Vice presidents for the new year are Homer Hagler of Armour & Co., and Ernest Reeder of Jahns Supply Co.

MAY 1

Pinehurst, N. C.—Concluding session of the quarterly meeting of the **Virginia-Carolinas Association**. Speakers: J. J. Barnhardt of Cannon Mills, Kannapolis, "Commodity Trends," and J. M. Knowlton, Atlanta, "The Present Conditions of Industry." The next quarterly meeting will be held at Asheville in July.

MAY 4

Oakland—Luncheon meeting of the **East Bay Group, Northern California Association**, at the Lake Merritt Hotel. "Pacific Electric Motor Day."

MAY 6

Salt Lake City—Meeting of the **Utah Association**, at the University Club. The following officers were elected for 1937-1938: *President*, L. V. Guild, Union Pacific Railroad; *Vice President*, R. A. Reid, Salt Lake County; *Secretary*, William L. Park, Salt Lake City Board of Education; *Treasurer*, S. W. Mote, University of Utah; *National Director*, B. L. Gunn, Tintic Standard Mining Co.

San Francisco—Luncheon meeting of the **Northern California Association**, at the Palace Hotel. Discussion of "Advance Buying," led by Frank D. Bryant, Standard Oil Co. of California.

MAY 10

New Orleans—Meeting of the **New Orleans Association**, at D. H. Holmes Restaurant. Committee appointments for the new year were announced, and arrangements for attending the Pittsburgh convention of N.A.P.A. were discussed.

Columbus—Annual meeting of the **Columbus Association**, at the Columbus Athletic Club. Walter Beebe was named as delegate to the N.A.P.A. convention, with E. M. Birkenback as alternate. The following officers were elected for 1937-1938: *President*, J. A. Carroll of Goldburg Iron & Steel Co.; *Vice-President*, V. R. Horne of White Castle System; *Secretary*, R. M. Giesy of H. H. Giesy Bros. Co.;

Treasurer, J. P. Jones of Pixley Electric Supply Co.; *National Director*, E. M. Birkenback of Ross-Willoughby Co.; *Directors*, G. R. Miller of Ohio Fuel Gas Co. and C. R. Applegate of Timken Roller Bearing Co.

Wyomissing—Dinner meeting of the **Reading Association**, at the Iris Club. A motion picture was shown, illustrating the manufacture of tires in the Goodyear plant, with explanatory comment by Harrison Peck of Berks Auto Ignition Co. Harry Kaufmann of Narrow Fabrics Co. led a discussion of commodity prices.

MAY 11

Rock Island—Meeting of the **Tri-City Association**, at the Fort Armstrong Hotel. Speaker: Herman Nelson of Bliss & Laughlin Steel Co., "Cold Rolled Steel," illustrated by a motion picture prepared by the company.

Milwaukee—"Past Presidents Night" meeting of the **Milwaukee Association**, at the Elks' Club. Sixteen of the nineteen men who have led the association since its organization in 1918 were present and spoke briefly.

Cincinnati—Dinner meeting of the **Cincinnati Association**, at the Hotel Gibson. Clifford Maish, "Tune Detective," entertained the meeting with a discussion and demonstration of "How Our Modern Song Hit Tunes Originate."

Indianapolis—Annual meeting of the **Indianapolis Association**, at the Hotel Washington. Officers for 1937-1938 were elected as follows: *President*, Frank C. Thompson of Link Belt Co.; *Vice President*, George C. Mercer of P. R. Mallory & Co.; *Secretary*, John T. Casebourne of Esterline Angus Co.; *Treasurer*, Louis Moller of Capitol Lumber Co.; *National Director*, C. Earl Byrket of Central States Envelope Co.; *Alternate National Director*, Roy R. Katterhenry of Indianapolis Power & Light Co.

Omaha—Annual meeting of the **Greater Omaha Association**, at the Elks Club. Officers for 1937-1938 were elected as follows: *President*, D. S. McWilliams; *Vice President*, E. C. Schack; *Secretary-Treasurer*, Harry I. Archibald; *Director*, D. M. Edgerly.

New York—Dinner meeting of the **Metropolitan Purchasers' Assistants Club**, at the Hotel Brittany. Speaker: John K. Conant of General Printing Ink Corp., and President of the New York Association, "Efficiency in Purchasing." Motion picture, "Glorified Lighting," presented through courtesy of the

Pittsburgh Plate Glass Corp. Discussion of paints, led by George C. Ashley of Dairymen's League Co-operative Association.

MAY 12

Springfield, Ohio—Meeting of the **Springfield Association**, at the Hotel Heaume. C. R. Shockey of Urbana spoke on plans for the coming N.A.P.A. convention, and Fred Andrews led a discussion of commodity trends.

St. Paul—Dinner meeting of the **Twin Cities Association**, at the Hotel Lowry, with officers of the Ford Motor Company as guests. Speaker: V. J. Harrington, sales manager of Ford's Twin City branch. The meeting was preceded by an afternoon trip of inspection through the Ford plant.

Buffalo—Meeting of the **Buffalo Association**, at the Hotel Statler. Speaker: Prof. Percy Wells Bidwell, University of Buffalo, "Business Recovery."

MAY 13

San Francisco—Joint dinner meeting of the **Northern California Association** with the San Francisco Sales Managers' Association, at the Commercial Club.

Chicago—Meeting of the **Chicago Association**, at the Hotel Sherman. Speaker: Julian G. Davies of N. Slater Co., Ltd., Hamilton, "Using National and Local Association Services and Facilities."

Duluth—Meeting of the **Twin Ports Association**, at the Spalding Hotel. Three new members were introduced at this meeting.

Springfield—Meeting of the **Western Massachusetts Association**, at the Hotel Kimball. Speaker: Adam Wilkinson of the American Writing Paper Co., Holyoke, "Labor Problems."

Dayton—Meeting of the **Dayton Association**, at the Engineers Club. Speaker: G. L. Rathel of Continental Steel Corp., Kokomo, Ind., "Shipments of Scrap Iron and Steel to Foreign Countries and Their Effect upon Home Industries." Officers for the new year were elected as follows: *President*, J. A. Cobey; *Vice-Presidents*, E. J. Barney and George Lebert; *Secretary*, J. E. Whitman; *Treasurer*, G. E. Young; *National Director*, B. A. Lutz; *Local Director*, M. L. Brower.

Seattle—Annual meeting of the **Washington Association**, at the Washington Athletic Club. Speaker: Wesley F. Rennie, General Secretary of the Y.M.C.A., "World Economic Aspects." Discussion: "The Purchasing Agent's Responsibility Toward Advancing Prices," led by C. G. Holloway of Isaacson Iron Works, Joseph C. Blucher of Fisher Flouring Mills,

JUNE 1937



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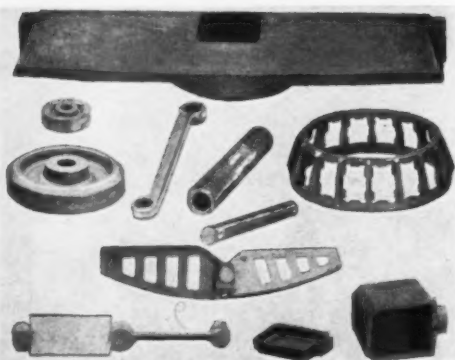
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and Henry Trowbridge of General Furniture Manufacturing Co. Motion pictures were shown of plant operations at the International Harvester Co.

MAY 14

New Orleans—Tour of the harbor, by the **New Orleans Association**, on invitation of J. M. Fush of the Dock Board.

MAY 17

Boston—Annual meeting of the **New England Association**, at Schrafft's. Speaker: Hon. William P. Connery, Member of Congress from Lynn, Mass., and chairman of the House Labor Committee, who spoke on various phases of recent labor legislation. Guest of honor at this meeting was N.A.P.A. President C. A. Kelley of Riverside, Cal., who spoke briefly on National Association affairs.

MAY 18

St. Louis—Meeting of the **St. Louis Association**, at the Desoto Hotel. Speaker: Wayne Ely, Attorney, "The Wagner Labor Act and What it Means to Industry and Costs." The Association extended a formal invitation to the N.A.P.A. to hold the 1938 convention at St. Louis.

New York—"National Officers' Night" meeting of the **New York Association**, at the Builders Exchange Club. Among the guests introduced were C. A. Kelley of Riverside, Cal., N.A.P.A. President; George A. Renard, Secretary-Treasurer; George M. Tisdale, National Vice President for District 8; Carleton Reynell, National Director; W. T. Hall, formerly National Treasurer, and now Assistant Secretary; and M. G. L. Harris, formerly National Vice President. Mr. Kelley spoke on association affairs and plans for the Pittsburgh convention. The address of the evening was on "The World Situation in Paper and Pulp," by Charles W. Boyce, Executive Secretary of the American Paper & Pulp Association.

Officers for 1937-1938 were nominated as follows: **President**, Benedict Van Voorhis of E. I. du Pont de Nemours & Co., Plastics Division; **Vice Presidents**, Leonard G. Tubbs of National Dyeing & Printing Co., and Harold K. LaRowe of Dairymen's League Co-operative Association; **Treasurer**, Edward B. Fielis of New York & Queens Electric Light & Power Co.; **Directors**, William G. Burns of Congoleum-Nairn, Inc., Carleton Reynell of Worthington Pump & Machinery Corp. and R. Park Lamborn of Kennecott Copper Corp.

Oakland—Luncheon meeting of the **East Bay Group, Northern California Association**, at the Lake Merritt Hotel. Special program arranged by R. W. Peterson of Durkee Famous Foods.

Louisville—Annual meeting of the **Louisville Association**, at the Kentucky Hotel. The following of-



He NOSE his PENCILS

And if YOU want the modern Colored Pencil you'll try MONGOLS—the kind with the strong thin lead you can sharpen to a needle-point. Clean brilliant color. Writes smoothly. Wears down slowly. Guaranteed not to break in normal use. This is the pencil modern executives are using to personalize their OK's, office memos, etc.—make them STAND OUT! Also, artists now PAINT with them—using brush and water. Made in 24 colors. Sold singly or in assortments. Round or Hexagon shape.

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Officers for 1937-1938 were elected: *President*, Louis Hartman of American Creosoting Co.; *Vice Presidents*, L. A. Anderson and G. M. Leep; *Secretary*, L. G. O'Connor; *Assistant Secretary*, Robert Parrot; *Treasurer*, J. T. Kimberger; *Directors*, W. M. Kerrick, B. Y. Heazlitt and R. L. Schmitt. Discussion of the coal market, led by W. M. Kerrick and John Byrne.

MAY 19

Canton—Meeting of the **Canton Association**, at the Elks Club. Speaker: John S. Gallagher of Ohio Power Co., "Men and Machines," with motion pictures.

MAY 20

San Francisco—Luncheon meeting of the **Northern California Association**, at the Palace Hotel. Speaker, Edwin N. Atherton, "The Grand Jury Investigation."

Toledo—Meeting of the **Toledo Association**, at the Waldorf Hotel. Speaker: George H. Halpin, Sales Manager of Minnesota Mining & Mfg. Co., "Diversification of Products in Modern Business." The following officers were elected for 1937-1938: *President*, Gordon S. Yost of Toledo Scale Co.; *Vice Presidents*, Edward Warner of Doehler Die Casting Co., and John Frautschi of Bunting Brass & Bronze Co.; *Secretary-Treasurer*, George L. Kibler of A. Bentley & Sons Co.; *National Director*, J. P. Meyer of Hixon-Peterson Lumber Co.; *Directors*, A. D. Campbell, Bert Pim, L. C. Warrick, Henry Poll, R. W. Witchner, and J. C. Diehl.

Albany—Meeting of the **Eastern New York Association**, at the University Club. Round table discussion on contracts and purchase orders. Officers for 1937-1938 were chosen as follows: *President*, W. T. Jones of Adirondack Foundries & Steel, Inc., Watervliet; *Vice President*, G. L. Brown; *Secretary*, C. F. Straney; *Treasurer*, S. C. Main; *Executive Committee*, H. L. Erlicher, C. P. Spuck, and R. H. Van Laer.

Grand Rapids—Annual meeting of the **Grand Rapids Association**. Officers for the coming year were elected as follows: *President*, Mayo Zeigler; *Vice President*, Howard Rogers; *Secretary*, Max Hensick; *Treasurer*, M. C. Ronan; *National Director*, Frank Clay; *Executive Committee*, N. A. Cairns, W. G. Hartmann and James Baker.

MAY 24-25-26-27

Pittsburgh—Twenty-second Annual International Convention and Inform-a-Show of the **National Association of Purchasing Agents**, at the William Penn Hotel. A summary of the proceedings and principal addresses is included elsewhere in this issue.

MAY 24

Phillipsburg, N. J.—Meeting of the **Lehigh Valley Association**, at the Harker's Hollow Country Club. The Committee on arrangements included W. O. Roe of Dixie-Vortex Co., Easton, Chairman, G. M. Overfield of Bethlehem and J. A. Nork of Catasauqua. Officers for 1937-1938 have been nominated as follows: *President*, Henry R. Chidsey of Warren Pipe & Foundry Co., Phillipsburg; *Vice President*, G. M. Overfield of Bethlehem Fabricators, Inc., Bethlehem; *Secretary*, R. E. P. Yoder of Wm. H. Taylor & Co., Allentown; *Treasurer*, W. M. Jarrett of Donaldson Iron Co., Emaus; *National Director*, R. C. Schaeffer of Taylor-Wharton Iron & Steel Co., Easton; *Directors*, T. C. Neil of Lehigh Structural Steel Co., Allentown, P. S. Killian of Bethlehem Steel Co., Bethlehem, R. K. Bryan of Victor Balata Textile Belting Co., Easton, J. A. Nork of Allentown Portland Cement Co., Catasauqua, and J. Carcione of Easton Car & Construction Co., Easton. The program, sponsored by Tidewater Associated Oil Co., included Motion Pictures of scientists and engineers in the Antarctic.

MAY 25

Oakland—Luncheon meeting of the **East Bay Group, Northern California Association**, at the Lake Merritt Hotel. Sound picture, "Twenty-four Min-

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GEO. H. MINK
Manager

MICHIGAN AVENUE AT CONGRESS

utes in El Dorado," presented by G. W. Wickland, through courtesy of the Wells Fargo Bank & Union Trust Co.

MAY 27

San Francisco—Luncheon meeting of the Northern California Association, at the Palace Hotel. Colored motion picture with musical background, "England," presented by Ward Harris of Ediphone.

MAY 28

Portland—Luncheon meeting of the Oregon Association, at the Mallory Hotel, followed by an inspection trip through the plant of Blitz-Weinhard Co.

The Operators' Viewpoint

(Continued from page 51)

to one of you than to another. When these factors are also included in your calculations of the price requirements under this Act, you pass beyond the realm of astronomical figures into a mathematical impossibility.

Obviously, nobody could apply literally the requirements of this Act in the span of an ordinary lifetime. Nevertheless, this law will be administered. Mines will have to be grouped together. Coals of slightly differing characteristics will have to be priced alike, for nothing else can be done.

This will mean that you as buyers will not be able to get the little gradations in prices that represent the fine shades of value that you would like to obtain in your purchases. It may mean also that the number of sizes of coal may be reduced as an administrative regulation.

Our Company and many others pride themselves on producing coal to the specification of the user, to give him the best suited coal for his needs. Our freedom of action in this respect, and that of every other producer who seeks to do likewise, may be circumscribed and restricted. You as buyers may not be altogether pleased with these restrictions but they are a part of the price that this experiment will cost.

Industry's Problems

(Continued from page 10)

Purchasing agents know more about price-making than any other single group in the country. When you note price increases made by monopolies, do you yield your usual good judgment and cry "inflation"? Now, honestly, when you see raw material prices on the move upward, can you honestly say that these are due to the "unbalanced budget," when for years you have seen the wire-pulling which manipulates stocks and prices? As I have come to know purchasing agents, they would think a long time before they would utter a series of involuted phrasing to indicate that the gold policy was responsible for the identical bids.

I do not wish to minimize or write-down in any way the seriousness of an unbalanced budget, or the strains

of any monetary policy. But I do ask for some realism—and for just as serious review of utterances of professional financial writers as you accord to actions by Government. Every Government act which affects business ought to have searching criticism and analysis by business men. This is the very essence by which democracy fixes responsibility.

Prices are not things themselves. They are the thermometer readings, not the weather, and they serve to tell what is going on within the economic system. Any attempt to influence prices must seek to influence those things which make prices, and purchasing agents usually welcome honest activities which aim at controlled prices.

The air is full of counsel as to what should be done about "boom and bust."

Some say: "let 'er ride"—and get ready for the bust by widening social security classes, improving the employment services, and improving the Government's credit.

Some say: "Use only the monetary controls, but use these to the limit."

Others say that the government should establish maximum price controls similar to those used by the War Industries Board during the World War.

Others say that the full force of executive and legislative powers should be used, before it's too late, in a fight to keep prices down and purchasing power up.

Again is heard the cry that the heavy hand of Government should be withdrawn every place it affects individual enterprise, and all will be well.

Which is the counsel of wisdom?

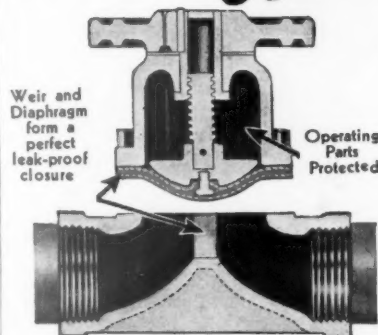
It is reasonable to take note that most business men now recognize that unrestrained competition cannot be relied upon as the almighty regulator it was often superstitiously thought to be. So do the leading economists of the world. In this area, business men and economists are close together, and current legislation tends to reflect the concurrence of law makers. Without criticism or praise, I point to the Guffey Act, to the wave of fair trade laws sweeping the states, to chain store legislation, to minimum wage decisions, and the prospects for new labor and industrial control legislation now on the horizon.

I point, also, to the almost universal demand that the economy be managed by close control over monetary and fiscal policies. Am I not correct in thinking that such acceptance is the spring-board for demands (and I mean demands and not acquiescence) by the business community—that Government act where it is clear that disaster is threatened?

Governmental intervention in economic affairs will inevitably increase as the recovery segment passes into other phases. Business men have a right to demand that the highest sense of earnestness and realism guide the decisions. I suggest one test which all may apply, a test which we found in NRA to be helpful under the impact of bewildering and alternative proposals: "Does it add to the production of goods and services?"

JUNE 1937

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NEVER REMOVED FROM
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for May 1937

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SPECIALIZED INDUSTRIAL CLEANING MATERIALS & METHODS

PAGE 69

Smart



AJAX — the economical drinking cup service offers utmost employee comfort and health protection. Smart looking Bakelite Dispenser, or steel in choice of colors—Wall or Cooler types. Delivers the AJAX wedge-shape Cup one at a time—bottom first. A smart purchase for office and factory.

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221 No. LaSalle Chicago

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416 Second St., San Francisco,
Calif.



Glass Industry

(Continued from page 25)

themselves rather more securely into the frame. This material is finding quite wide application and in the laminated form will presumably prove most useful for the glazing of aquaria, the under water illumination of swimming pools, and similar applications which might include dance hall floors. This glass, while highly heat resistant, does not qualify as a fire retardant.

Approximately 70% of the total flat glass production of the country is presently being used in the glazing of automobiles. In general, virtually all of the automobiles on the road today are glazed with laminated Safety Plate Glass. This product is fabricated by assembling together two lights of glass with a sheet of plastic material cemented between them. This plastic material may be either cellulose nitrate, cellulose acetate or one of the newer synthetic resins. Tremendous progress in the improvements of laminated Safety Glass has been made since its original introduction, and consequently there is absolutely no comparison between present day Safety Glass and that which we originally saw. This product lends itself particularly well to the development of glass which will resist gun fire, and it is possible to produce a laminated Safety Multiplate which will resist several shots from an Army service rifle, using armor piercing bullets.

Coke By-Products

(Continued from page 21)

tance, and when the World War shut off many of these supplied by Europe, the challenge to American industry was taken up and in the last twenty years has seen enormous strides in the manufacture of all kinds of perfumes, dyes, insecticides, disinfectants, plastics, so-called coal tar drugs and kindred products. All this means a very small return to the coke oven operator, to the tar distiller, but the raw material contained in this two percent is the

basis for the investment of millions of dollars and products worth millions of dollars per year entering into the manufacture of practically all manufactured goods today. In 1914, the total value of dyes manufactured in this country amounted to but \$2,500,000. In 1937 this figure will approach \$150,000,000 and few dyes are made abroad which we cannot duplicate.

It might be well to point out the fact that the control of germicidal diseases, the control of insects in farm and home are also of most vital importance, using coal tar bases.

Do you think it an exaggeration to say that modern life owes much to the Coking Industry and that in its continuity depends what we consider as civilization itself?

Container Board

(Continued from page 28)

the basis of quality. Today he has to take whatever he can get.

Finally, we must not forget one factor which is in the "Lap of the Gods"—the new production coming in happens to arrive during a period of expansion rather than depression. The consumer has learned that just as high pressure selling always brings disaster to the seller, so high pressure buying does not give the purchaser any long run benefits. Since the last depression a portion of the container board losses during those years were absorbed by bankruptcies and forced sales, and particularly by labor and management. But a large part of these losses are being paid for at the present time by the consumers who find themselves faced with a shortage of productive equipment due to the fact that concerns which were in the red could not get money to equip themselves to supply the demand when it did arrive. The future therefore shows a fundamentally sound position. It remains to be seen how the producers and the purchasers will take care of temporary fluctuations when incoming tonnages for short periods overbalance demand. Over the long pull the new capacity is not overproduction, it is necessity.

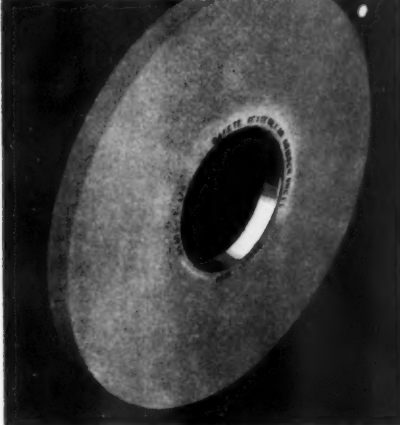
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Grinding wheels for any purpose.
High grade portable and floor grinders.

The Safety Grinding Wheel and
Machine Co.
Springfield, Ohio.

SAFETY

The Copper Industry

(Continued from page 31)

influence. Competition from other metals and alloys has increased with rapid strides, and the price of copper must either remain on a competitive level or turn over a portion of its market to these substitutes.

A new factor of great influence is the tremendous foreign capacity to produce at comparatively low costs. Even with the present import tax, the potentialities of foreign production will act as an automatic brake against exorbitant prices.

As stated, actual consumption moves up and down in fairly long tangents. On the other hand, demand exhibits a series of peaks and depressions, especially when influenced by speculation.

It is obvious that, if it were possible to eliminate the speculative element in the marketing of copper and copper products, a great step would be taken to stabilize the price. The term "speculation" is here used in a broad sense. It embraces not only the operations of the gambling non-consumer who purchases copper for resale at a higher price, but also those of the consumer who buys, on a rising market, tonnages far in excess of his actual requirements; the fabricator who, in anticipation of an advance in price, "protects" his customers by booking for them speculative sales for delivery at distant future dates; and the producer who, in turn, and in similar manner, is required to "protect" his customer, the fabricator. The term, of course, includes the scrap gatherer who alternately starves and overfeeds the custom plant and thus accentuates the rise and fall of copper prices. The practices mentioned are, of course, entirely legitimate and, undoubtedly, seem to be in line with prudent business judgment at the time, but, by and large, they are the determining factors which work against stability of price in the copper market, the one thing desired above all others by producers, fabricators and consumers alike.

VICTOR
NO-DRAFT FANS



The New
Tornado
HI-VELOCITY
AIR CIRCULATORS

**FLOOR,
CEILING AND
SHELF MODELS**

Better COOLING
...LOWER Cost!

Replace many scattered installations of small fans with these modern, super-powerful circulators and enjoy maximum cooling at minimum expense. The high velocity, long distance, horizontal air stream at a height of 8 ft. from the floor keeps all the air in constant motion—without drafts or blasts. Powered by extra-heavy duty motors and equipped with new-type, quiet blades.

A COMPLETE LINE

All Sizes . . . All Types

There's a Victor Fan model for every cooling need—and every one a mechanical masterpiece with many exclusive convenience features. Desk and overhead types; 8, 10, 12 and 16 in. sizes; stationary and oscillating. Every Victor circulating fan guaranteed 5 full years.

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MAKERS OF VICTOR VENTILATING FANS



"BREEZE-SPREADER"
DESK AND WALL FANS
No drafts—no blasts, and therefore no summer colds from these amazing fans equipped with patented "Breeze-Spreader" Satisfying heat relief with safety.



**VICTOR OVER HEAD FOR
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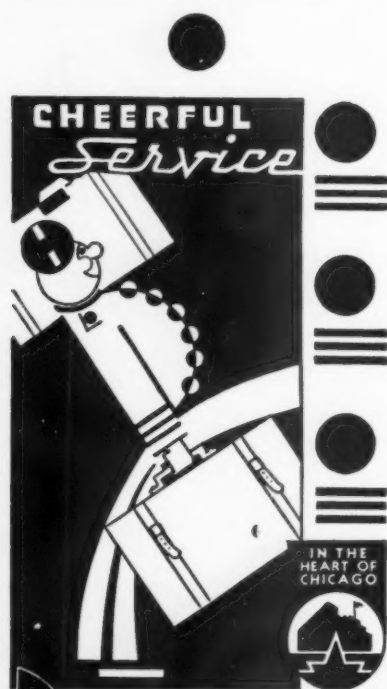


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SILICON CARBIDE
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(AFRICAN)
TURKISH EMERY**

Refiners and Makers
of
**ABRASIVE GRAINS
AND
FLOURS**

AMERICAN ABRASIVE COMPANY
WESTFIELD, MASS.



**BISMARCK
HOTEL CHICAGO**
RANDOLPH AND LA SALLE

Emil Eitel - Karl Eitel - Roy Steffen

Vice Presidents

(Continued from page 20)

duties, he is now secretary and treasurer of the company and directs the manufacturing operations. Joined the Toronto Association about 15 years ago, served as president in 1935, and two terms as national director. Mr. Barber is married, and lives in Toronto. His recreations are golf and bowling, and he holds membership in the Granite Sporting Club and the Rosedale Golf Club.

District No. 6

JAMES EDWARD O'BRIEN, Purchasing Agent of the Fanner Mfg. Co., Cleveland. A native of that city, he attended high school, and then started work with the E. H. Luetkemeyer Co., wholesale hardware. After nine years with the Cleveland Foundry Co., he joined the Fanner organization as purchasing agent in 1911. A consistently hard and dependable worker in the Cleveland Association, not only during his terms as president and national director, but also in the ranks and on committee assignments. His interest and activity has extended throughout District 6 and in national association affairs. A regular attendant at N.A.P.A. conventions, his energy and ability have been among the chief factors in putting over the two conventions held in Cleveland. The Early Birds Dinner for 1934 brought him widespread recognition for his talent in staging such large scale entertainment—a talent that has frequently been demonstrated in the management of smokers and boxing shows for the Cleveland Association and other organizations in that city. Jimmy is an ardent and able exponent of all types of sport. He is a member of Columbia Hills Golf Club and has been for many years a yachting enthusiast. As a member of the Cleveland Yacht Club, he participated in important races at Chicago, Toledo, Toronto, Long Island and other points. The O'Brien family includes five daughters and two sons—Virginia May, 20;

Frank, 18; Ruth Ann, 16; Corinne Patricia, 14; Gertrude, 12; Jimmy, Jr., 10, who already shows promise of a brilliant athletic career; and Louise, 7, who shares with her father the birthday date of March 8th.

District No. 7

JAMES MARSHALL ALEXANDER of the Tennessee Furniture Corp., Chattanooga. Born at Bellefonte, Pa., he graduated from Williamson Trade School, Philadelphia, where he learned pattern making. Turning to the field of trade education, he studied at Pennsylvania State College, University of Pittsburgh, Columbia University, and at the Munich Trade School in Germany on a special study for the State Department of Education. Taught in trade schools in New York and Pennsylvania, and during the World War served as instructor in the Training center for Mechanics, at Albany. Became director of training in the "vestibule school" of Tennessee Furniture Corp. in 1920. Six years later, when the supply of trained operatives exceeded demand, he took over the materials department. Attended N.A.P.A. conventions regularly for several years before the organization of the Chattanooga Association, and was active in the formation of that group. He has two sons—James, Jr., 16, and Davis, 13,—and a daughter, Ruth, 10. At his home on Lookout Mountain he has ample opportunity to indulge his hobby of gardening. Also enjoys fishing, and until recent years was a member of Rotary. As trustee of the Presbyterian Church, he helped to maintain a reasonable operating surplus during depression days, an accomplishment which augurs well for N.A.P.A. in his new post as financial officer of the association.

District No. 8

FRANK HENRY CARTER, Purchasing Agent of Dietrich Bros., Inc., Baltimore. Native of Baltimore, and graduate of Cornell University, 1916, in mechanical and industrial engineering. Lieutenant in the Air Service during the war,

Improved WIREGRIP BELT HOOKS

WIREGRIP comes on processed cards that prevent waste—every hook can be used. Protects fingers. Applied with a WIREGRIP Lacer or any other standard make belt lacing machine.

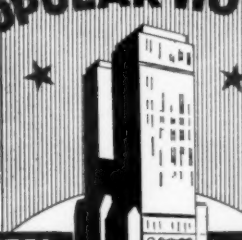
Flexible BELT LACING

STEELGRIP is a stronger lacing for all power and conveying belts. Clinches smoothly into belt, compresses ends, prevents fraying. 2-piece hinged rocker pins prevent excessive wear. In boxes or long lengths.

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PHILADELPHIA'S POPULAR HOTEL



HOTEL ADELPHIA

YOUR HOME AWAY FROM HOME

Every Room with Bath
Most Moderate Rates

FOUR RESTAURANTS

Floor show at dinner and supper in Cafe Marguery

NEAREST EVERYTHING
CHESTNUT at 13th ST.

FOR SALE

Sheldon Colorimeter in good condition. Priced reasonable for quick sale. Address Box 301, c/o PURCHASING, 11 West 42nd St., New York, N. Y.

stationed at Air Production Center No. 2, A.E.F. Started business as industrial engineer with the McCord Mfg. Co., Detroit. Entered purchasing as assistant to E. M. Chilson, Manager of Purchases for J. G. White Engineering Corp., New York. Became purchasing agent for Crown Cork & Seal Co., Baltimore, then for Dietrich Bros., fourteen years ago. His sport is golf. His real hobby, organization work. He has carried that interest and ability over into association work with the Baltimore Association. His latest project—first industrial products exhibition staged under the auspices of this group—was eminently successful, and the "second annual" is already well sold.

District No. 9

BENJAMIN BAYLIS, Purchasing Agent of Rumford Chemical Works, Rumford, R. I. Born in New York City, where he attended the public schools and took special collegiate courses at Columbia University. Started work in New York, and was transferred to the Boston office of Billings, King & Co. as "assistant manager" in a two-man organization. Then with the Great Northern Paper Co. at Boston and at the Millinocket, Me., plant. Joined the Rumford Works in 1909 as assistant in the management division. When the company's purchasing was centralized in 1929, Baylis was chosen for the position of purchasing agent. He became a member of the Rhode Island Association at that time, and served as president two years ago. He has a married son, Thomas, and a daughter, Barbara, 15. Long an enthusiastic and able tennis player, a knee injury caused him to change to golf. His real diversion, however, is flower gardening, and the yard of his home in Providence is a mass of bloom. Formerly active in the Town Criers of Rhode Island; a consistent worker on Community Chest campaigns; a Thirty-Second Degree Mason who has done much to foster youth work in the DeMolay and Rainbow organizations.



Abbott Bearing Balls have proved their worth to Industry. But let your production men make their own tests. We'll gladly send samples.

- ... test them for SURFACE
- ... test them for TOLERANCE
- ... test them for STRUCTURE

When it's time to order, remember Abbott—for dependable bearings are the rule with Abbott Balls in the race.

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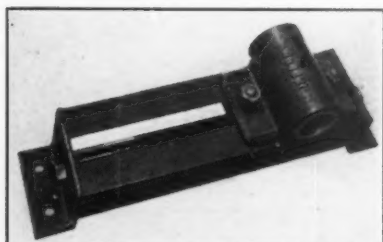


BRONZE VALVES

No. 412

THIS NEW LINE of bronze valves in globe and angle patterns, now available in sizes up to 2", is distinguished by seats and discs of exceptionally hard stainless steel. The trim is heat treated to a hardness of 500 Brinell and then machined on a diamond boring machine. This feature enables the valves to smash paper clips, nails, pipe turnings, boiler scale and sand without marking either the seat or the disc, and lowers maintenance costs because of added resistance to wire drawing and steam cutting.

See coupon below



TAKE-UP BEARING

No. 413

IN THIS NEW ASSEMBLY, the bearing rides a pair of parallel angles and is clamped in position when it is correctly set. Welded end pieces provide rigid support and backing for a screw that threads through the lower part of the bearing casting. Because of the clamping arrangement to the angles, there is no

strain on the screw except in changing the bearing position, and an inverted shield protects the threads from dirt.

See coupon below

HEAVY DUTY WRENCHES

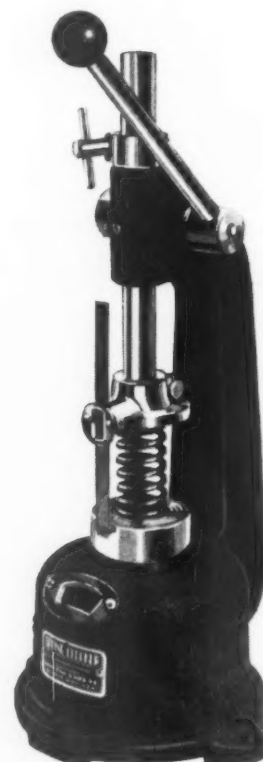


No. 414

BUILT FOR ABUSE is this new line of drop forged box socket wrenches of alloy steel in straight, offset and angle types with stub ends to accommodate tubular extension handles for leverages up to 30 to 1. Also equipped with striking sleeves that are designed to protect the handles when loosening or setting nuts in close quarters with a hammer or sledge. Openings range from 1 1/4 to 3 1/2 inches, in the double hexagon (12 point) style. Handles are interchangeable, and a single or double end wrench of the size and style required can be quickly assembled.

See coupon at left

SPRING CHECKER



No. 415

THIS PATENTED TESTING device is for the special purpose of determining the strength of compression coil springs. A pilot sleeve fitting over a pilot shaft, with ball bearings at top and bottom, eliminates lateral movement of the weighing

PURCHASING

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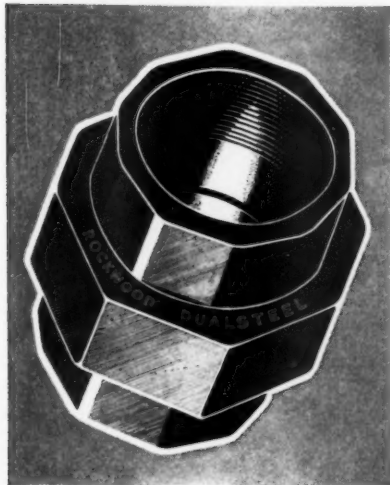
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table but permits free vertical movement, resulting in accurate readings on the load dial. It can be set for fixed height when a number of similar springs are to be tested, by means of a clamp on the load rack. The device is self contained and need not be carefully levelled for accurate operation. Fast enough for production testing and accurate beyond ordinary requirements. The standard model weighs 22 pounds. Available in 50 lb. capacity, calibrated in $\frac{1}{4}$ lb. units, and 250 lb. capacity, reading to 1 lb. Other ratings furnished to order.

See coupon page 74



DUALSTEEL UNION

No. 416

GREATER TENSILE STRENGTH and Brinell hardness than either forged steel or malleable iron, and greater resistance to corrosion, characterize these new unions of a special metal of dense structure similar to that of tool steel. The unions are completely Parkerized, including the threaded areas, which also acts as a thread lubricant and assures "free breakage" of union parts. Recommended for plant maintenance work and other installations where unions are broken apart and remade several times during the life of a pipe line, and for use up to 600 lbs. working steam pressure, 2,000 lbs. hydrostatic pressure, and temperatures up to 900 degrees Fahrenheit.

See coupon page 74



PORTABLE GRINDER

No. 417

PRECISION BUILT, with $\frac{1}{7}$ h.p., 18,000 r.p.m. universal motor, large ball bearings, aluminum housing, and $\frac{1}{4}$ in. chuck for grinding points, drills, rotary files, arbors and adapters, this equipment serves a variety of purposes, including the grinding of small tools and routing in wood or non-ferrous metals. It may be used free hand to grind dies, remove burrs on small metal

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With LYON STEEL SHELVING

● In the stockroom of every industry Lyon Steel Shelving is helping to conserve space, save material handling time, and reduce storage cost. A Knitting Mill—right in the heart of Georgia's lumber country—standardized on Lyon Steel Shelving because of more efficient operation, reduced fire hazard, and important saving in maintenance cost. Lyon Shelving is standardized, all parts are interchangeable. An installation made today may be added to, or rearranged, at any time . . . with absolute assurance that all parts will fit perfectly. Why not let a Lyon representative check cost-cutting possibilities in your stock, stores or tool storage department. There is no obligation.

LYON METAL PRODUCTS, INC.
3306 River St. AURORA, ILL.

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COMPRESSION · EXTENSION · TORSION · FLAT SPRINGS · SPRING WASHERS
WIRE FORMS · SMALL STAMPINGS · COLD ROLLED SPRING STEEL

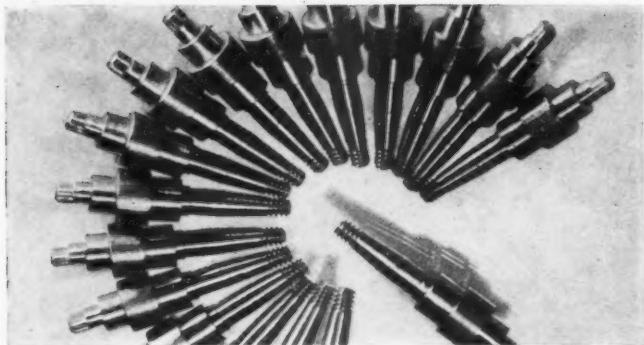


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COMPLETE HEAT TREATING EQUIPMENT OIL, GAS, ELECTRIC · ALL STANDARD FINISHES
SPECIAL DEPARTMENT FOR SMALL ORDERS · EXPERIMENTAL DESIGN CO-OPERATION



"Mark Time"!

Bearings for a "Mark Time" switch mechanism. Imperative were clean knurling and threading, concentric diameters, square shoulders, accurate taper. Tolerances of .0005 to .001 observed religiously. A job that had to be (and was) in keeping in every detail with the fine mechanism used in "Mark Time" products. If you are interested in parts that square with highest fabrication standards,

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of springs and screw machine parts. Particular (yes, exacting) people find in it just the data they want.

PECK SPRINGS AND SCREW MACHINE PARTS

The Peck Spring Co. - 10 Walnut St. - Plainville, Conn.



for **WELDING**
of Large Pieces

THE answer to your Heavy Welding Problems. Put them up to us. Benefit by our experience in welding parts for the highest-powered Kaplan turbines ever built.

S. MORGAN SMITH Co.
YORK, PA.

parts, remove flashing on die castings, and to carve wood. With a lathe holder, it may be used to true up lathe centers and for shallow internal and external grinding on work held in the lathe.

See coupon page 74



DUSTLESS WEIGHING HOPPER No. 418

THIS DEVICE HANDLES all kinds of powders such as are used in drug, cosmetic, paint and chemical industries. It comprises a set of butterfly gates for controlling the discharge of the contents of the hopper, operating coincidentally with a sliding sleeve which raises and lowers vertically by means of toggle connections to the shaft. The sleeve consists of two annular rings. Contents of the hopper are discharged through the inner ring, and the space between the rings permits the displaced air in the tank to be automatically returned, with the dust, directly into two flues in the interior of the hopper.

See coupon page 74

TENSIONING TOOL

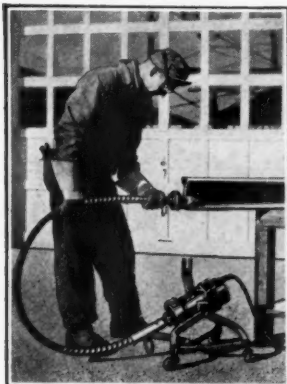


No. 419

AN IMPROVED TOOL for tensioning steel strapping around large and heavy packages and bundles features the automatic gripper action controlled by the handle in such a way that it automatically releases the drawing and holding pawls, freeing the windlass and releasing the strap gripper, making it a "one hand tool." The base is exceptionally long, thus preventing tilting of the tool in tensioning, and is of solid construction,

which prevents the possibility of oil dripping on the surface of the package. The gripper plate is hardened for endurance and long wear, and a finer spacing of the ratchet teeth provides greater power.

See coupon page 74

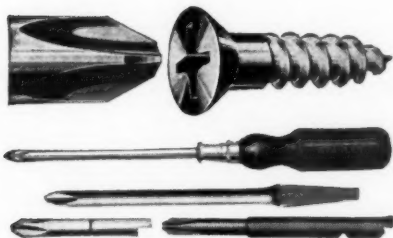


FLEXIBLE SHAFT GRINDER

No. 420

A HIGH SPEED GRINDER (9,000 r.p.m. on either 110 or 220 volt, A.C. or D.C. currents) which also delivers high horsepower to the working tool, this equipment is said to accomplish the same results with a 4" wheel as may be obtained with an 8" wheel on slow speed units. 1½ h.p. universal motor, with flexible shaft. It is recommended for grinding weld seams, flat surfaces, surfacing and snagging castings, grinding stainless steel and other industrial grinding jobs.

See coupon page 74



SCREW-DRIVERS AND BITS

No. 421

FOUR SIZES OF SCREWDRIVERS and machine bits in this new line accommodate all sizes of Phillips screws and bolts with recessed right-angled slots. The screwdrivers are of heavy duty design, with hardwood or composition handle riveted to the shank, and the bits are for use with bit braces or electric screwdriver chucks.

See coupon page 74



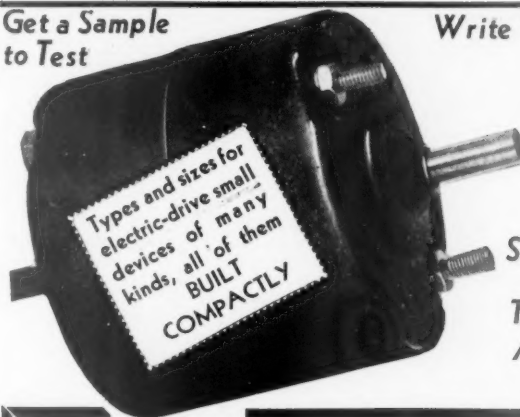
SLOW SPEED DRILL

No. 422

AVAILABLE IN ¼ in. and ½ in. sizes, these new slow speed, high torque drills have been developed particularly for drilling in steels of high nickel content, such as Monel and Al-legheny metals, stainless steel, etc. The slow speed (350, 450, 600, and 750 r.p.m.) lengthens the life of twist drills and eliminates the need for frequent sharpening, but without sacrifice to drilling speed because of the high torque feature which will not stall at maximum capacity. One-hand grip adapts this tool to

Get a Sample to Test

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Small Motors Built to Give SERVICE

They Keep All Hands Satisfied

Get Fractional Horse Power ELECTRIC MOTORS Where You Get Them RIGHT

LOOK into our line of compact 'precision-built fractional horse-power motors . . . They're built to give A-1 service in automobile and bus heaters—juice extractors—kitchen mixers—electric drills—hand vacuum cleaners—other light apparatus. Reversible types for automatic radio tuning . . . Precision-built for real service, by specialists for a generation in producing light electric motors.

Write us in detail about your motor requirements. Please specify required power, speed and voltage.

The GENERAL INDUSTRIES CO.
3743 Taylor Street Elyria, Ohio

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● A Northern Kraft Tape with a special glue formula and "TREAD" Gumming account for its superior quality and many exclusive advantages.

Sterling
"TREAD" GUMMED TAPE

THE GUMMED PRODUCTS CO.

OFFICES TROY, OHIO MILLS
MAKERS OF TROJAN GUMMED TAPE
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NO BELT SLIPS with VACUUM CUP METAL PULLEYS

GUARANTEED to:

Eliminate belt slippage and power loss because the belt is sealed to pulley at vacuum contacts . . . Increase life of belts and equipment . . . enable machines to take larger cuts and operate at maximum capacity . . . wear indefinitely . . . keep belts from flying off . . . Sizes from 2" up to 72" . . . recommended for short center drives . . . Try one at our risk on your worst drive.

Vacuum Cup Metal Pulley Co., Inc. 1010 Ford Bldg.
Detroit, Mich.

MARVEL

Unbreakable Alloy Steel Body



HIGH SPEED EDGE
HACK SAW BLADES

Genuine
18%
Tungsten
High Speed
Steel Teeth

Patented
Integral
Weld

"More Cuts—Same Cost"

Combine the finest cutting edge, genuine 18% Tungsten High Speed Steel, with an unbreakable alloy steel body at the same cost of ordinary high speed blade and you have a hack saw blade that price for price outcuts all others—reduces production set-up cost to minimum and means more cuts per dollar.

Write for Circular 5860 Bloomingdale Ave., Chicago, Ill., U.S.A. "The Hack Saw People"



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Bituminous Coal

MINES: Scalp Level, South Fork, Hastings and La Rayne Districts of Penna., and Fairmont District of West Virginia.

SIZES: Lump — Egg — Nut — Pea — Stoker — Mine Run—Especially Prepared Coal for Pulverizing.

CORTRIGHT COAL COMPANY

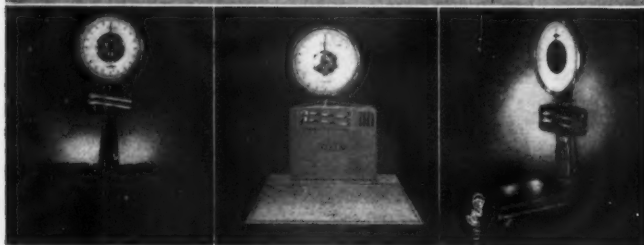
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DIAL SCALES
for industry's every need

THE KRON CO.
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close quarter work. Smooth operation is assured by ball bearings on armature and spindle. Aluminum bodies give strength, durability and light weight. The 1/4 in. size is 14 in. long and weighs 6 1/2 lbs. The 1/2 in. size is 14 1/2 in. long and weighs 8 lbs.

See coupon page 74

CARBOY DUMPER



No. 423

ONE OPERATOR CAN easily handle carboys with this device, by means of a crank and chain, from a position sufficiently removed from the bucket to avoid dangerous fumes or acid burns. The outstanding feature of design is the introduction of two centers of rotation. By this means, the pouring stream can be held to a single spot and the carboy may be emptied completely without losing a drop or changing the position of the bucket. It is mounted on rollers and can readily be moved out of the way when not in use.

See coupon page 74

GAS MASK



No. 424

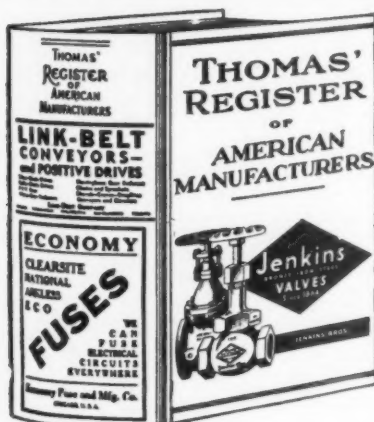
THE UNIQUE FEATURE of this mask is the built-in transmitter, reproducer, battery and switch, which enable the wearer to carry on a normal conversation while working in smoky or gas-filled atmospheres, without sacrificing any protection. The equipment is contained in a fabric carrying case which also holds the purifying canister for the mask. The battery is a specially designed unit, specifically for use in this assembly, and the switch is arc-proof. The mask is suitable for use in any atmosphere which contains a sufficient supply of oxygen to support life.

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Business is modernizing. The growing demand for the Easy-Writing Royal is proof of that! Executives have found that it pays to *Modernize with Royal*—pays in lowered operating costs, in faster work, in finer typing.

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ROYAL TYPEWRITER COMPANY, Inc.
2 Park Ave., New York. Factory: Hartford, Conn.

World's largest company devoted exclusively to manufacture of typewriters. Makers also of the Royal Portable for student and home use.

WORLD'S NO. 1

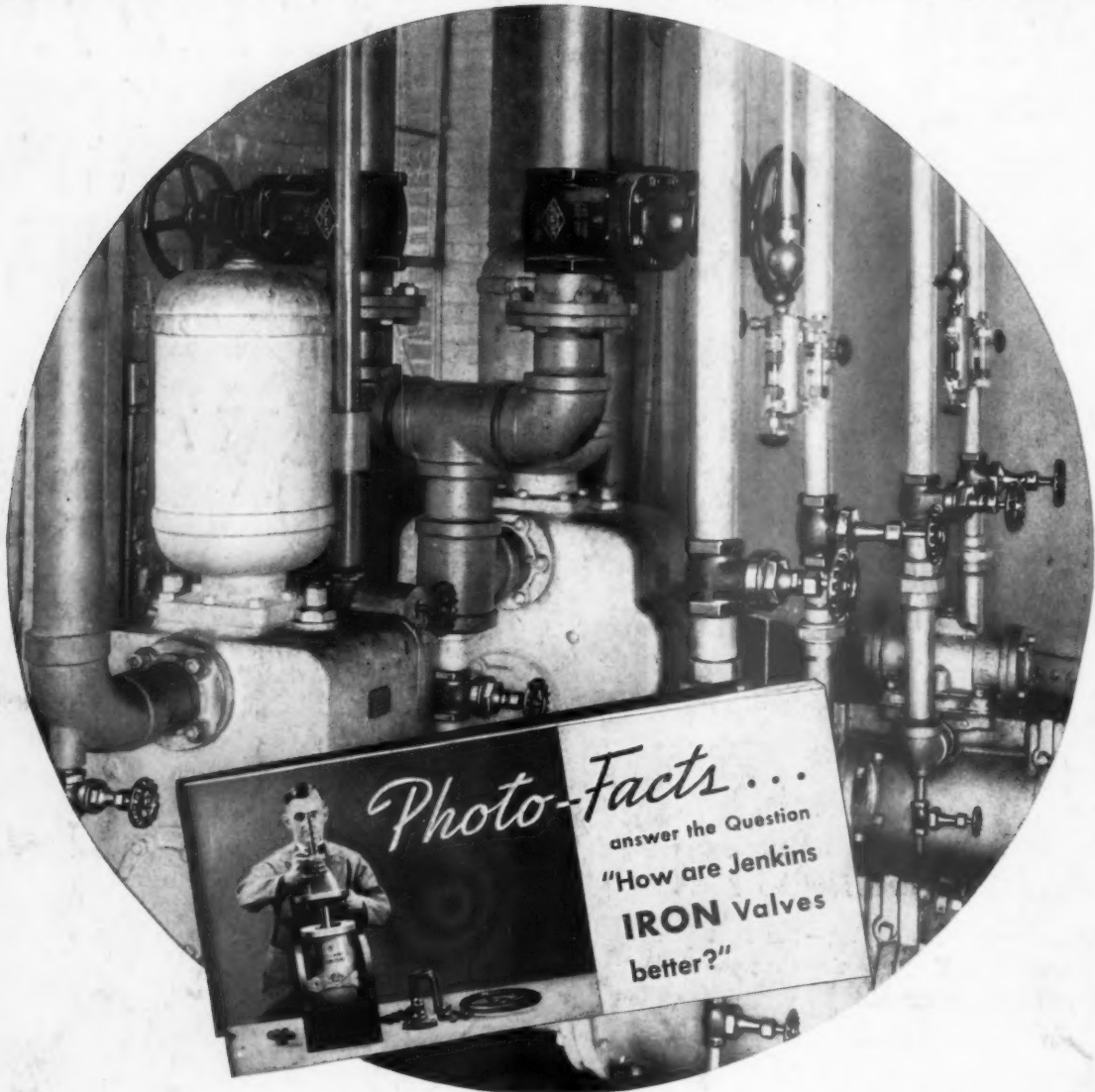


TYPEWRITER

*Trade-mark for key-tension device

Natural Allies for Economy!

Add Jenkins IRON Valves to the job for lowest costs



LARGER pipe lines are as important as the small ones, on which hundreds of plants and buildings consider it wise to use Jenkins Bronze Valves as standard equipment. For that reason, Jenkins quality is bound to be a good investment. But, there is another reason...even stronger...why it pays to use "the best" in IRON valves, too.

That reason is seen in the cost sheets. Valve trouble on large lines is far more expensive, as a rule, than on small lines. It requires a great deal of time and labor to take down large valves for repair. Parts and replacements are more costly. Frequently, lengthy service interruptions are involved. **ONLY** the best is good enough where trouble "comes high". That is why Jenkins IRON Valves will be found working side-by-side with Jenkins Bronze Valves where maximum economy is sought.

Why they are being picked as the best in IRON valves is made clear in the interesting new "PHOTO-FACTS" booklet shown here. It will pay you to get a copy and see what Jenkins offers...at the standard price of good IRON valves. Just use the coupon, or ask your supply house for a copy.

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